

FEB 19 1937



# MOTOR AGE

CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

*Jan here?*

FEBRUARY

1937

## IN THIS ISSUE



### Clutches—Brakes— Windshield Wipers

These three important and timely topics are discussed by service experts in this issue. You can profit by reading them. But that isn't all—there are a hundred-and-one other service subjects worthy of your closest attention. You'll find many ways to increase your business. Some of the best methods are discussed in "Selling Service." Successful servicemen read Motor Age from cover to cover.



# THEY SAVE AND YOU PROFIT WITH GENUINE FORD PARTS

## ROBERTS ICE & FUEL SPRINGFIELD, MASSACHUSETTS

Ford Motor Company  
Somerville, Mass.

Gentlemen:

We have twelve of your Ford Trucks and every one is giving us wonderful service. They all offer the performance expected of larger, more expensive trucks, but the low initial cost, small up-keep and operating expense make them an ideal investment for us.

All repairs are made at nominal cost and your Engine and Parts Exchange Plan assures us there will be no long tie-up waiting for parts.

Yours very truly,

(Signed) MICHAEL ROBERTS

## P. D. CLINE & LEON ELLIS GENERAL CONSTRUCTION GREENSBORO, N. C.

Ford Motor Company  
Charlotte, N. C.

Gentlemen:

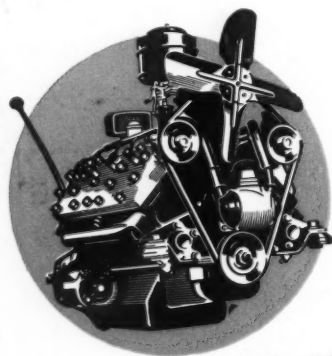
Probably the best way we can express our preference for Ford Trucks, is that after years of experience with all makes of motor trucks, the first purchase made in September, 1933, was ten Ford Dump Trucks. Since that time we have purchased twenty additional Ford units.

The rugged construction of Ford Trucks, their ability to go anywhere and "to take it and like it," the motor replacement feature, together with the easily accessible service anywhere, has completely sold us.

Yours very truly,

(Signed) LEON ELLIS

LET THE FORD ENGINE AND PARTS EXCHANGE PLAN  
DRAW CUSTOMERS INTO YOUR SHOP . . .



### FACTORY-RECONDITIONED PARTS

DISTRIBUTOR  
FUEL PUMP  
CARBURETOR  
GENERATOR  
CONNECTING-ROD  
BRAKE SHOE  
ASSEMBLY

CRANKSHAFT REAR  
BEARING CAP  
CLUTCH DISC ASSEMBLY  
CLUTCH PRESSURE  
PLATE ASSEMBLY  
SHOCK ABSORBERS  
GENERATOR ARMATURE  
CYLINDER ASSEMBLY

FORD Car and Truck owners prefer Genuine Ford Parts. They know the savings to be made through the Ford Engine and Parts Exchange Plan. The two letters above are typical of many received almost daily at the Ford offices.

When repairs are needed on their cars and trucks, these Ford owners — and millions of others like them — look for the sign "Genuine Ford Parts." They know that sign will lead them to Ford Quality, Ford Workmanship, Ford Economy.

Why not let this sign draw customers into your shop? If you don't display this sign now, call the Genuine Ford Parts Distributor in your territory today. It will be the dawn of a new profit day for you.



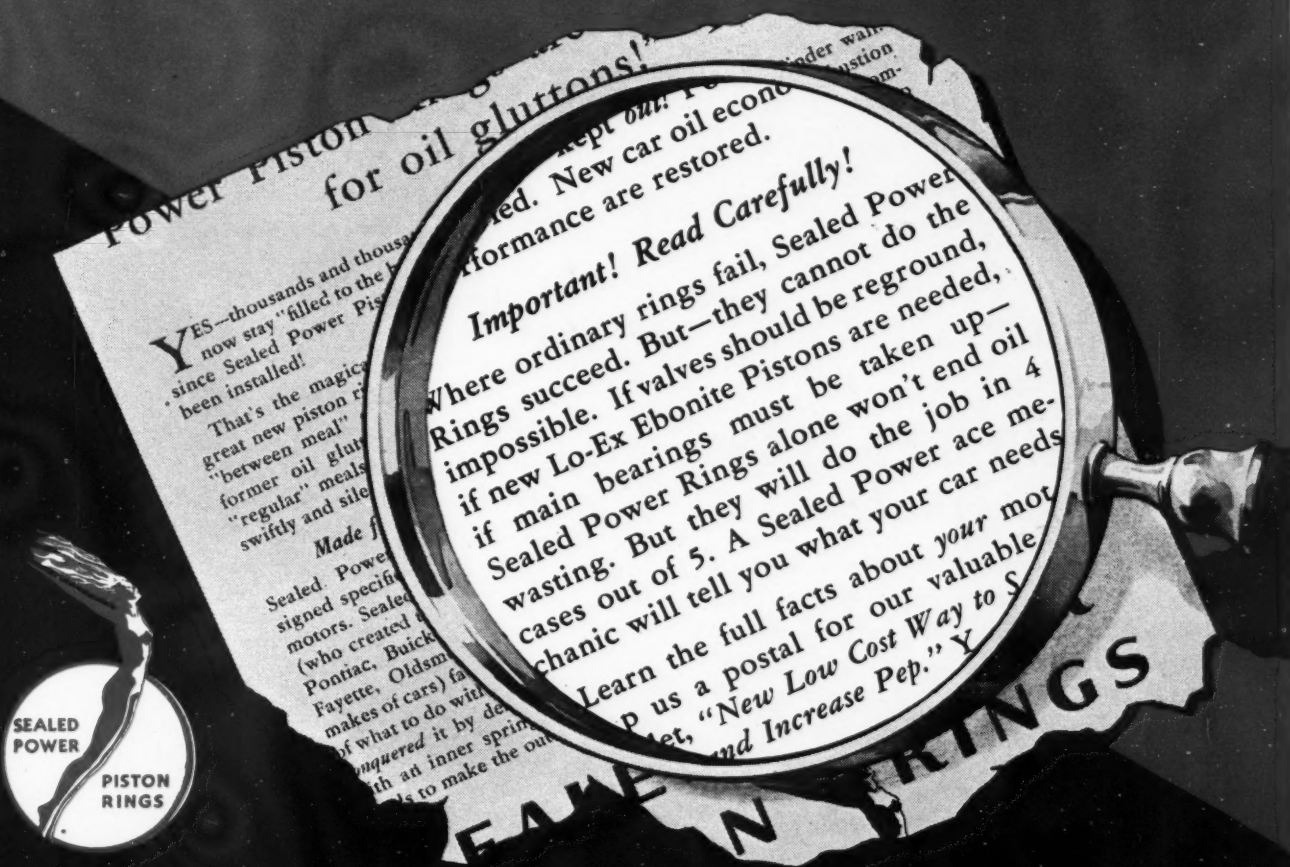
FORD MOTOR COMPANY • DEARBORN, MICHIGAN



# *This Warning*

WILL BE READ BY

## MILLIONS OF MOTORISTS IN SEALED POWER ADVERTISEMENTS



### This WARNING To Motorists Protects You!

We believe, frankly, that too much has been claimed for piston rings. Some advertising would have one believe that by merely installing new piston rings, horns blow louder, tires won't go flat, and windshields always stay clean.

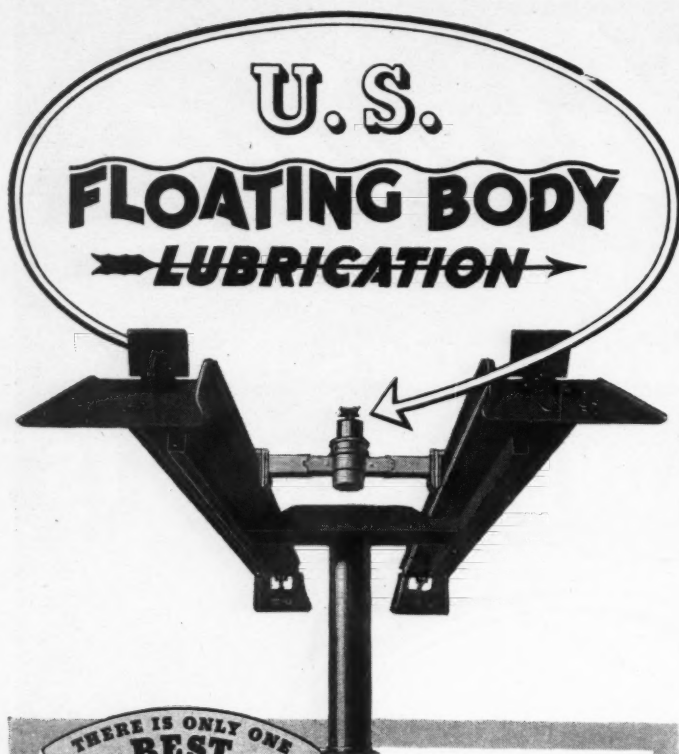
Now, while new piston rings will end excess oil consumption in the majority of cars, frequently new Lo-Ex pistons have to be installed, valves reground, bearings taken up. So—in Sealed Power advertising, motorists are told that!

And told, too, to have faith in their repairman!

Sealed Power Rings will do all (and judging by performance records—far more) than any other piston rings. But they can't do the impossible. So we don't claim the impossible. Thus Sealed Power advertising never puts repairmen on the spot. We believe you will approve this warning to motorists.

SEALED POWER CORPORATION  
Department 242 Muskegon, Michigan

## SEALED POWER PISTON RINGS



Champion, The Dude of Redgate  
owned by Chas. A. Guyer, Redgate  
Kennels, Saint Paul, Minnesota

## THE "MIRACLE MAN" of Lubrication

U. S. Floating Body Lubrication has been an absolute sensation from coast to coast. Reports keep pouring in from small operators and major oil companies alike claiming increases in business from 25% to 500% showing how quickly floating Body Lubrication pays for itself. It has the greatest merchandising appeal, greatest business building possibilities and the greatest driving thrill for the motorist. It is one of those rare pieces of automotive equipment that really does wonders for the service station and wonders for the car. Motorists will notice immediately the remarkable improvement in the riding, driving and running of their car. Regardless of your location, U. S. Floating Body Lubrication will positively increase your business.

Write for the free booklet on  
Floating Body Lubrication



**AIR  
COMPRESSOR  
COMPANY... CLEVELAND, OHIO**  
AIR COMPRESSORS • AIR TOWERS • HYDRAULIC LIFTS  
GREASING EQUIPMENT • CAR WASHING SYSTEMS

# MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT  
REPAIR SHOP

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MOTOR AGE, February, 1937



# SHOP TALK

UNTIL the men striking in the General Motors plants decide to go back to work, business, for the most part will mark time. Even maintenance is being affected in many sections.

THE article on mufflers and the exhaust system, entitled "Stop That Exhaust Gas Attack," which appeared in the January issue of MOTOR AGE has attracted a lot of attention. Among many letters which praised the article was one from G. E. Weaver, Executive Vice-President of the Weaver Mfg. Co. Mr. Weaver feels that I passed up a good bet by not bringing out that in Memphis during the first inspection period of 1935, out of 42,127 cars registered, 1490 were rejected for defective mufflers. These were only the worst cases, many others were warned and in the second and third inspection periods 2316 and 2905 cars respectively were rejected for defective mufflers. . . . Assuming that the average price of a muffler is \$4.00, and the labor for installation is \$3.50, it would seem that the maintenance men of Memphis had been overlooking \$50,000 of business. Applying the same percentage to the entire United States, there is \$172,500,000 of muffler business to be picked up by the shops that have the ambition to put a car up on a hoist and look at the muffler. Thank you Mr. Weaver for the figures on which these assumptions are based.

IN the current issue of the Automotive Trades Association Bulletin (Kansas City, Mo.), it is stated that plans are being developed to improve their flat rate service by providing car factory schedules in 1937. . . . Users of the Chilton Flat Rate Manual al-



ready have such information as it is given in the column headed "MFR. HR." on each flat rate page. Incidentally, there is no relation between the time given in the "MFR. HR." column and the price given in the "Labor" column. The latter is a Chilton price and is based entirely on researches made by the Chilton staff.

O. C. ROHDE, chief engineer of the Champion Spark Plug Co., warns mechanics to be careful when tightening spark plugs. Unless plugs are tightened to the proper degree, excessive plug temperatures will result. On 18 mm. plugs in iron cylinder heads the correct torque is 35 to 55 ft. lb., in aluminum heads, 35 to 45 ft. lb. On 14 mm. plugs the limits are 32 to 38 ft. lb., with no distinction being made for different head materials. On the new 10 mm. plugs

20 ft. lb. should be used when tightening the plugs. To get an idea of the correct pull on a wrench, use a spring scale at the end of a wrench 1 ft. long. The actual pull indicated on the scale will then be in ft. lb.

WITH all the floods we are having, it would seem worth while to repeat, that the only safe way to recondition a flooded auto is to completely dismantle all of the units, clean, and then reassemble. And when we say "all the units" we mean all. Sand and dirt in wheel bearings, rear axle, transmission, clutch, engine, starter and generator can do plenty of damage. And the only way to insure against come back jobs, is to do a complete job the first time.

*Bill Toboak*

# Brake Service

## On 1937 Bendix

## Duo-Servos

### Detailed Procedure For Overhauling and Adjusting These Units

**J**UST how well the brake manufacturers have answered the challenge for better and safer brakes is evidenced by the many improvements that have been added year after year. One has only to compare the brakes with which present-day passenger cars are equipped, with the brakes in general use ten years ago, to fully appreciate the advances that have been made in the interest of safety and efficiency.

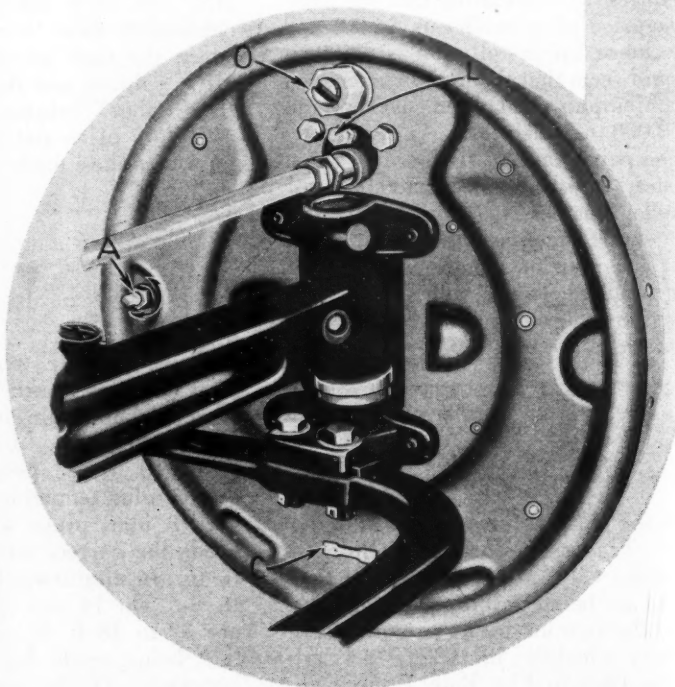
And (praise be to Allah!) these changes have greatly simplified the mechanic's job of adjusting and overhauling brakes. Gone are the days when it was necessary to use a pint of penetrating oil to free up brake rigging on each job before the mechanic could begin to adjust the brakes. No more frozen turnbuckles, broken pull rods and brake bands that are all out of shape. No longer does it take the best part of half a day to get a satisfactory brake adjustment—just look at the Operation B-3 for the 1937 Models in the Chilton Flat Rate Manual and you will find that this operation can be performed in less than an hour!

Many of the 1937 Models are equipped with Bendix two-shoe, single anchor, Duo-Servo action brakes hydraulically operated, with a hand brake operating the service shoes of the rear wheels by cables for parking. The hydraulic system of this type of brake consists of a

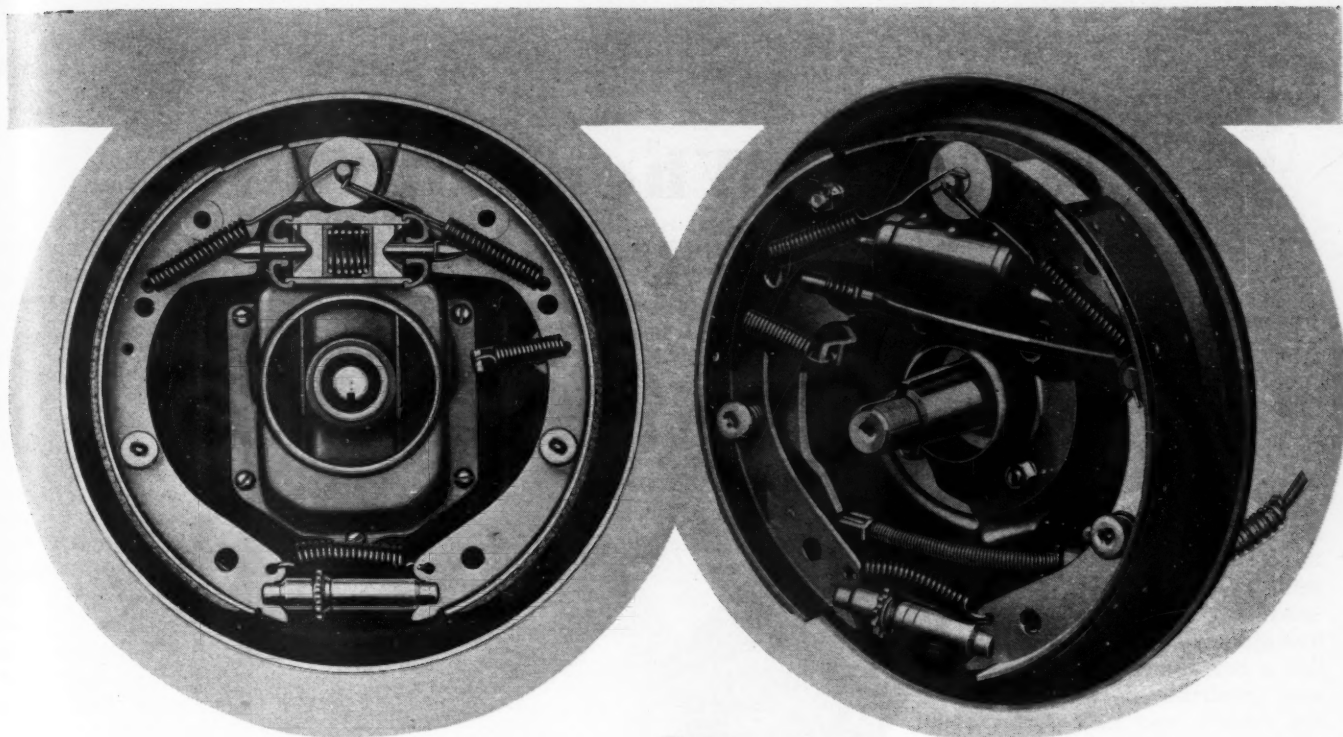
compensating master cylinder connected by tubing and hoses to a double-piston wheel cylinder at each wheel. The brake shoe assembly consists of two shoes, each held to the brake backing plate by a single pin and spring so that it is free to float within the housing when the brakes are applied. This mounting prompted the name Duo-Servo (double service), since its total braking effort combines the actual pedal pressure with the wrapping action imparted to the shoes by the rotating force of the brake drum.

The first point to check when making an adjustment of the Bendix hydraulic brake is the free pedal travel. The pedal must have a free movement of at least  $\frac{1}{2}$  in. before the piston in the master cylinder starts to move. This is very important, as the piston must always be allowed to re-

turn to the extreme "off" position when the brake pedal is released, to allow the piston cup to uncover the small port in the master cylinder reservoir through which the fluid returns from the compression cylinder. If this port is partially blocked there will be a constant build-up of pressure in







**By**  
**Robert Hankinson**

the compression cylinder and fluid lines with each brake application, and the result will be dragging brakes. Adjustment for free pedal travel is provided in the linkage connecting the brake pedal with the master cylinder piston rod.

A minor adjustment for wear is performed at each wheel. Jack all four wheels off the ground, loosen the lock nut and turn the eccentric "A" (see opposite page) in the direction of forward wheel rotation until there is a heavy drag on the brake drum. Then back off the eccentric very slowly until the drum is just free of brake drag, and tighten the lock nut. Remove the adjusting hole cover (C) in the backing plate, and with a special adjusting tool (or a screw driver) turn the notched adjusting wheel to expand the shoes until a light drag is felt on the drum. Then back off the notched adjusting wheel until the drum is free. Perform the same operation to each wheel, being sure that the notched adjusting wheel is backed off the same number of notches each time, to insure equalization. Also be sure to replace the adjusting hole cover, otherwise mud and water will enter the brake housing and seriously effect the operation of the brakes.

Under normal conditions this adjustment will compensate for the wear that has taken place, and the

results will be satisfactory. But there are times when it is not possible to obtain a good adjustment by this method, due to unequal wear, or due to the anchor pin having been improperly located.

When it becomes necessary to relocate the anchor, it is important that the clearance between the lining and the drum be checked with a feeler gage. There is a slot in the brake drum through which the feeler gage can be inserted, altho it is sometimes necessary to remove the wheel to uncover this slot. The clearance is measured between the drum and the lining of the secondary shoe only; the secondary shoe is the one controlled by the eccentric adjustment. After loosening the eccentric lock nut and uncovering the hole in the drum, insert a .010 in. feeler gage and rotate the drum so that the clearance at the anchor end and the adjusting end of the secondary shoe can be checked. This clearance should not vary more than .003 in., and if it does it will have to be corrected by changing the position of the anchor.

Loosen the lock nut at the anchor "O." Two types of anchors are used, the eccentric type (as illustrated on opposite page) and the sliding type. If the eccentric type is used it is only necessary to turn the anchor pin with a screw driver to raise or lower the

shoe assembly in the housing to obtain the proper clearance at the anchor and adjusting ends of the secondary shoe. If the sliding type of anchor is used, tap it lightly up or down as required with a hammer. When the proper clearance has been obtained, be sure to tighten the anchor lock nut as tight as possible with a 16-in. wrench.

From that point proceed with the adjustment of the shoes in the same manner as previously outlined.

When making a complete brake adjustment it is important that the hand brake also be properly adjusted. The cables extending from the rear wheels to the brake cross shaft should be disconnected at the cross shaft. After the eccentric adjustment has been completed at each rear wheel, and the shoes of both wheels are expanded so that there is an equal brake drag, adjust the cables at the clevis so that the pins will just enter the cross shaft levers when all slack is removed from the cables. Care must be exercised to pull the cables forward only just enough to remove the slack, and not hard enough to apply additional pressure to the brake shoes. Then back off the notched adjusting wheels the same number of notches at each wheel until the drums are free of drag, and test the hand brake for equal application at each wheel. Always loosen the tight brake to equalize.



**When You Sell  
Super-Service —**

**Give Them  
Something  
to Remember  
You By**

**S**UPER service is an automotive term broadly used to describe almost anything from porcelain enameled wash rooms to the last lonely gasoline outpost you meet before jumping off into the trackless wastes of Death Valley. But super service is more than an architect's dream—it's a form of merchandising that includes the service station building and everything and everybody in it!

Super service is a selling method designed to move merchandise and services offered by the serviceman

to the car owner—and move them quicker, more effectively and consequently at greater profit for the super service operator.

It can be applied to increase gasoline, oil and lubricant sales—tires, batteries and radios—and to sell

quick services, more quick services than a flywheel has teeth.

This business goes to those repair shops and service stations which are doing an outstanding job of selling extra quick service to car owners regularly. But what can a service station do to stand out from the crowd? How can you, as operator, avoid becoming "just another filling station?"

A check-up of several southern stations shows a few things they do "to be remembered by," ideas which may be used by service sta-



## By George H. Watson

tions anywhere. Most of the station operators agree that it is often the little things which count most with motorists and bring them back, assuming that other conditions are equal.

The Wilson Service Station, Ensley, Ala., sends a simple post card to newcomers in its community, welcoming them as neighbors and inviting them to make the station their headquarters for their automotive needs. If the new residents have good credit ratings, the station offers to open accounts in their name. The names and addresses of the newcomers together with a report on their credit is furnished by the local merchants' credit association.

The list is fresh and free from deadwood, and that service station operator gets first crack at the new business in his neighborhood. You can bet that a great majority of those new prospects appreciate the friendliness and aggressiveness of this super service salesman.

Fred Kelly's Service, Cullman, Ala., has a plan to appeal to tourists stopping at the city's only hotel. About midnight (it is an all-night station) an assistant goes up to the hotel, checks the tires and cleans the windshield of cars parked around the block. A "Good Morning" card is placed under the windshield wiper of each car, giving the air pressure on each tire and inviting the owner to visit the station "just around the corner." Pleased by this show of initiative, many tourists accept the invitation.

Station operators in sections where there are a lot of unpaved roads, might emulate the example of W. Y. Shugart, proprietor of the Standard Service Station, Fort Payne, Ala. He installed a pressure washing machine (with 400 lb. pressure on the nozzle) and also an

electric vacuum cleaner. He points out to farmers and others living on dusty roads that it is foolish to lubricate a dirty car without first washing it. With this equipment Mr. Shugart has built up a reputation for "The Best Washing and Lubricating Job in the Town." He washes 2500 cars and lubricates 2000 cars per year, although located in a mountain town of less than 2500 persons.

A signal system which sets a bell to ringing as a customer's car rolls into the station serves a mark of distinction for Gulf Signal Service,



Birmingham, Ala. S. C. Spivey, manager, being of an inventive turn rigged up the system which consists of a gasoline gage with diaphragm and two pieces of air line hose laid along joints in the station floor at the sidewalk line. Wheels of automobiles passing over the hose set up vibrations in the brake liquid contained in the hose and rings the bell. This prevents customers from rolling up to the gas tanks unnoticed while the station manager is inside.

Another Birmingham concern, the Courthouse Service Station has come to be known as a stopping place for cars with trailers. Parking space is provided so they can make an overnight stop and then fill up the next morning. Still another station in the city, the Rex Service Station makes a practice of renting trailers, three being owned and kept on the road most of the time. This sideline helps to build gas and oil and accessory business



and is profitable in its own right.

The Avenue G Service Station in Birmingham makes a practice of bidding for the business of new automobile owners in the community. Their names are obtained from the license bureau and a call made on them. J. Gardner, proprietor, finds that new owners are particular about their cars and like to find a place where they can get jamb-up service and where the proprietor will feel a responsibility for the proper and continued upkeep of their machines.

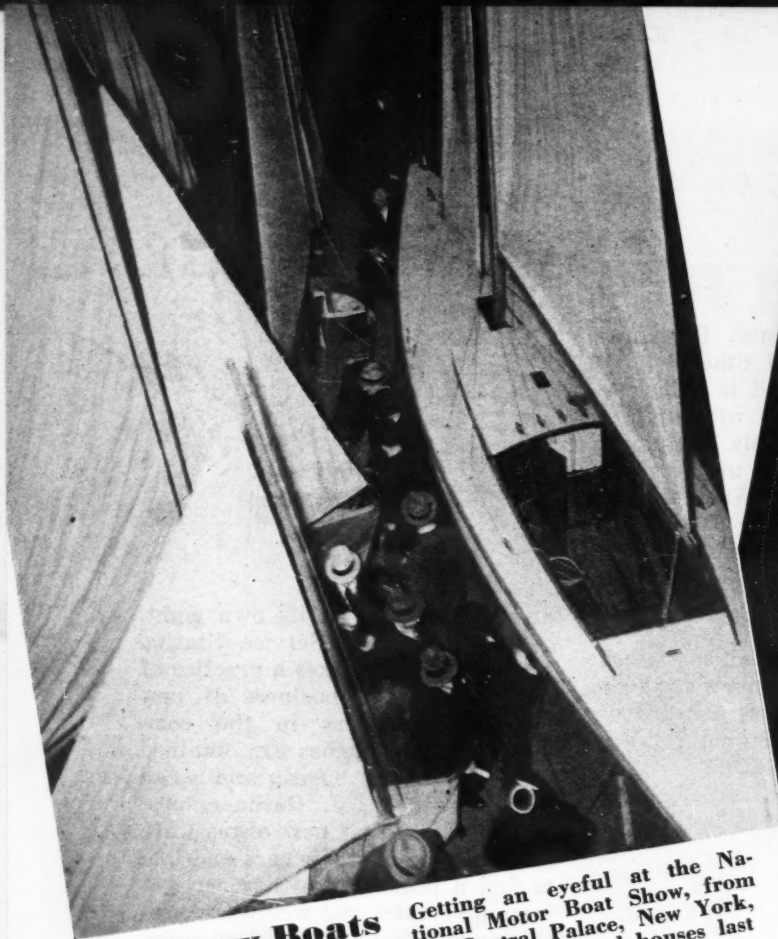
A station in Birmingham operated by the Mutual Oil Company made a deal with the local automobile owners' association whereby it draws several thousand customers through its station monthly. Non-members are also served but this connection has more than doubled the gallonage of the station.

Another station utilized a distinctive idea in its construction. It is known as Gasoline Alley running through from one street to the other in the middle of a block and attracting business from both thoroughfares. The rent is not as high as for a corner, yet corner advantages are enjoyed.

In getting out advertising matter that is "different," R. L. Godbold, co-manager of the Jeff Davis Service Station, Montgomery, Ala., reports that a mimeograph machine is quite an asset. Mail matter of a distinctive nature can be turned out at small expense. One of his pieces recently sent out was headed "We check everything," and showed a half dozen station attendants (in miniature) swarming all over a customer's car. Such illustrations can be drawn by any free hand artist in a few minutes.

So the parade of ideas goes on. Any station operator who thinks and reads should not want for something to make his place of business stand out from those of his competitors.





**Show Boats** Getting an eyeful at the National Motor Boat Show, from the balcony of the Grand Central Palace, New York, where the show of boats played to packed houses last month



**Shaping Up Nicely** Business is shaping up nicely for the Miami super-service operator who has a chorus—oops! we mean crew of six gals working at his station, so 'tis said

## Say It With Pictures

IS picture-making your hobby? If so, here's an opportunity to make some extra money. MOTOR AGE will pay \$5 for each photograph submitted by its readers which appears on these pages. Photos will be judged on quality

as pictures and on their reader-interest value. A short descriptive caption is required, telling "who, what, where, how and when" about each photo. Unused pictures will be returned without comment.

**Tough Going** Harry Hartz, race driver, found plenty of winter weather on the 10,000-mile economy run he made in a Chevrolet pick-up

**Truckee Slippee** Riding into a terrific snow storm near Truckee, Calif., this truck slipped over the embankment on Donner Summit Grade and required the assistance of a local garage man to be hauled out. Severe weather conditions in many sections of the country have kept maintenance men busy







*"The boys take turns every Saturday night!"*

# Clean Up On Windshield Cleaner Service

**Often Neglected - Repairing Windshield Wipers Can Be Made a Profitable Business. Here's How To Do It**

*By Robert Hankinson*

POSSIBLY one of the most annoying as well as the most dangerous things that can happen to a motorist when he gets caught in a rain, sleet or snow storm is to have his windshield wiper quit. Poor vision, and practically blind driving in some cases, is the result. How many times the reason "I couldn't see" has been given as the cause of an accident! And yet, of all the gadgets on the car that require fixing, the windshield wiper is perhaps the easiest to repair, but is the one most neglected because the owner doesn't think of it until he gets caught in a storm and really needs it.

With the entire country "safety conscious" as it is at the present time, through national advertising campaigns, movies and what-not, the way is paved for the wide-awake service man to cash in on the opportunities for profit offered through windshield wiper service, and at the same time do his bit toward making driving safer.

Mechanically or electrically operated windshield wipers are in the minority, and by far the greater number are of the vacuum-operated type. With approximately 18 inches of vacuum in the intake manifold with which to operate the wiper, the first point to check when the wiper quits is to determine if that

amount of vacuum is actually available. Leaking valves, leaking manifold gaskets and poor wiper tube connections will cause a drop in the amount of vacuum in the manifold, and of course, slow down or actually stop the wiper. Many cars use a booster pump in combination with the fuel pump, to provide steady operation of the wiper during acceleration. If the booster diaphragm is cracked and leaking, the wiper will slow down considerably, and will stop entirely when the engine is speeded up. Servicing the fuel and booster pump combination is another story, but it is evident that if the diaphragm is leaking it must be replaced before satisfactory windshield wiper operation can be secured.

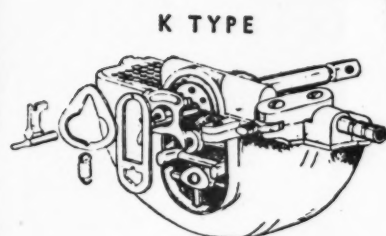
Some cars use a flexible rubber hose to connect the booster pump to the tubing running to the intake manifold. This flexible hose has a

habit of closing up, due either to the vacuum causing it to collapse, or to being twisted when it was installed. This makes the booster pump ineffective, with the result that the windshield wiper receives no assistance from this source. If a new hose is not available, a satisfactory repair can be made by cutting the hose in the middle and inserting a short piece of copper tubing.

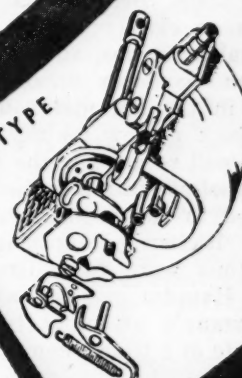
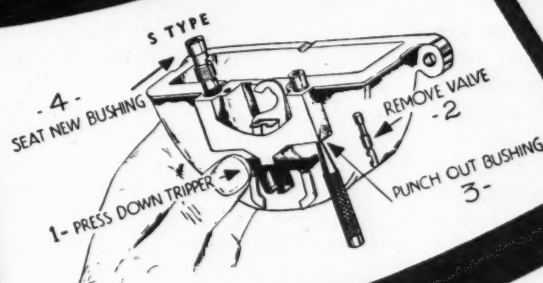
Having determined that sufficient vacuum is available, and that it is being delivered up to the wiper motor with no loss due to split tub-







K TYPE



RS TYPE

ing, poor connections or cracks in the rubber tube at the wiper motor, the next step is to check for free operation of the wiper blade against the glass, and in the case of a dual wiper installation, for binding of the wiper arm shafts and the links connecting the wiper motor to the shafts. If the blade is pressing too hard against the glass, the tension can be relieved by cut-

ting off one or two coils of the spring on the wiper blade arm. If the blade does not wipe clean due to lack of pressure against the glass the tension can be increased by stretching the wiper arm spring. Do not bend the wiper arm, as this will not increase the tension of the blade; the blade pressure is controlled by the spring on the arm.

A great many of the recent model

cars have the windshield wiper motor located in back of the instrument panel instead of above the windshield, and the wiper blades operate from the base of the windshield. The wiper arm shafts are operated by sector gears, and are attached to the cowl metal by a plate held by two screws. When these screws are removed, the plate and shaft may be removed. The purpose of this is to lubricate the shaft and gears so that no binding or stiff

(Continued on page 59)

# Garage MEN

## Can Aid War on CRIME

**Without Turning Detectives, Servicemen Can Cooperate in Law Enforcement. Here Are a Few Suggestions by the Creator of the Radio Feature—"Gang Busters"**

**By Phillips Lord**

THE automobile, which has contributed so largely to changes in social conditions in the United States since 1900, has unwittingly played a part in the growth of crime and its development on a grand scale. Because the automobile is so closely bound up with criminal activities, automotive servicemen have an opportunity to assist in the national house-cleaning which is now taking place.

You will recall how the alertness of a gasoline-station attendant contributed to the eventual arrest of Bruno Richard Hauptmann. His suspicions were first directed toward Hauptmann because of Hauptmann's attempts to pass a gold-note at a time when such notes had been withdrawn from circulation. Later the bill was discovered to be Lindbergh ransom money.

Another example may be drawn from the arrest of the kidnapper, Thomas H. Robinson, in Pasadena, Calif. Robinson was identified by Lynn Allen, a drug-store clerk, but information supplied by James Rowray, who operates an automobile parking lot, also proved useful to the Department of Justice. Rowray reported that a person who, he thought, was a man dressed in woman's clothing, drove into the parking lot accompanied by a male companion. Their car was a 1935 or 1936 LaSalle coupe. Mr. Rowray further stated that his attention was directed to this car as it had what he believed was a special paint job, maroon color, with approximately three stripes around the body in contrasting color. Rowray reported that these persons left the car in his lot shortly before the time the man dressed as a wo-

man was reported seen in the Owl Drug Company store, and returned and drove off about 40 minutes later. Again alertness and careful observation on the part of an automobile serviceman—who sees many automobiles in a single day—was of material assistance to the law.

Until the passage of the National Motor Vehicle Theft Act (commonly known as the Dyer Act) the attempts of the police to apprehend gangsters were seriously hampered. A pursued criminal could pass over the borderline of the State in which the crime had been committed, out of that State's jurisdiction, and of necessity the pursuit ended. But the Dyer Act made it a Federal offense to steal and transport a motor vehicle from one State to another, and consequently Government agents were enabled to go after men like Dillinger.

Those who work in garages and filling-stations, coming in contact with so many cars every day, have an opportunity for spotting stolen cars, recognizing or identifying their occupants, and assisting the G-Men to track down gangsters who have probably violated far more than the National Motor Theft Act.

In our "Gang-Busters" series on the Columbia network we are trying, not only to dramatize vividly



Phillips Lord, writer, actor and producer of the radio series of law enforcement dramatizations, "Gang Busters"

the work being accomplished in the crusade against crime, but also, if possible, to make a contribution to that crusade. Thus at the end of every program we give to the radio audience a number of clues: descriptions of men wanted, of crimes committed, of missing persons, and





## Tips From The G-Men

**JOHN EDGAR HOOVER**, head of the G-men, states that automobile mechanics can help curtail the activities of automobile thieves by being on the look-out for stolen cars and reporting suspicious vehicles to local police departments or sheriff's offices.

**I**N many cases stolen vehicles are easily spotted by mechanics working on them if certain things are looked for. For instance, one of the first things an automobile thief will do after stealing a car is to change or obliterate the motor and serial numbers. In changing the numbers the thief uses a die and a hammer and adds additional numerals to the numbers or he attempts to change numerals such as 1s to 7s, 3s to 8s, etc. In so doing, it is very seldom that he is able to duplicate exactly the indentation of the factory applied numbers.

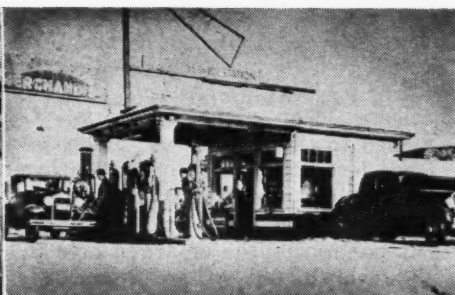
**EXTRA** license plates, bunches of car keys, and dies under the back seat of a car are a suspicious circumstance.

**ROUGH** paint jobs on late model cars are worthy of investigation. Odd equipment, such as 1932 wheels on a 1933 car, show an effort on the part of the driver of the car to change its appearance.

—from an interview with J. Edgar Hoover, by Elliott Curtiss, in *Automobile Trade Journal*.



From this Bronx, N. Y., service station the trail of the Lindbergh kidnapper was picked up



Final ransom demands in the recent Mattson case are said to have been phoned from this station



J. Edgar Hoover, Chief of the Federal Bureau of Investigation of the Department of Justice

so forth. Since these are broadcast over a nationwide hookup, it is our hope that they may occasionally reach a place where they will do some good. Lynn Allen, whom I have already mentioned, is a case in point, since he heard the descrip-

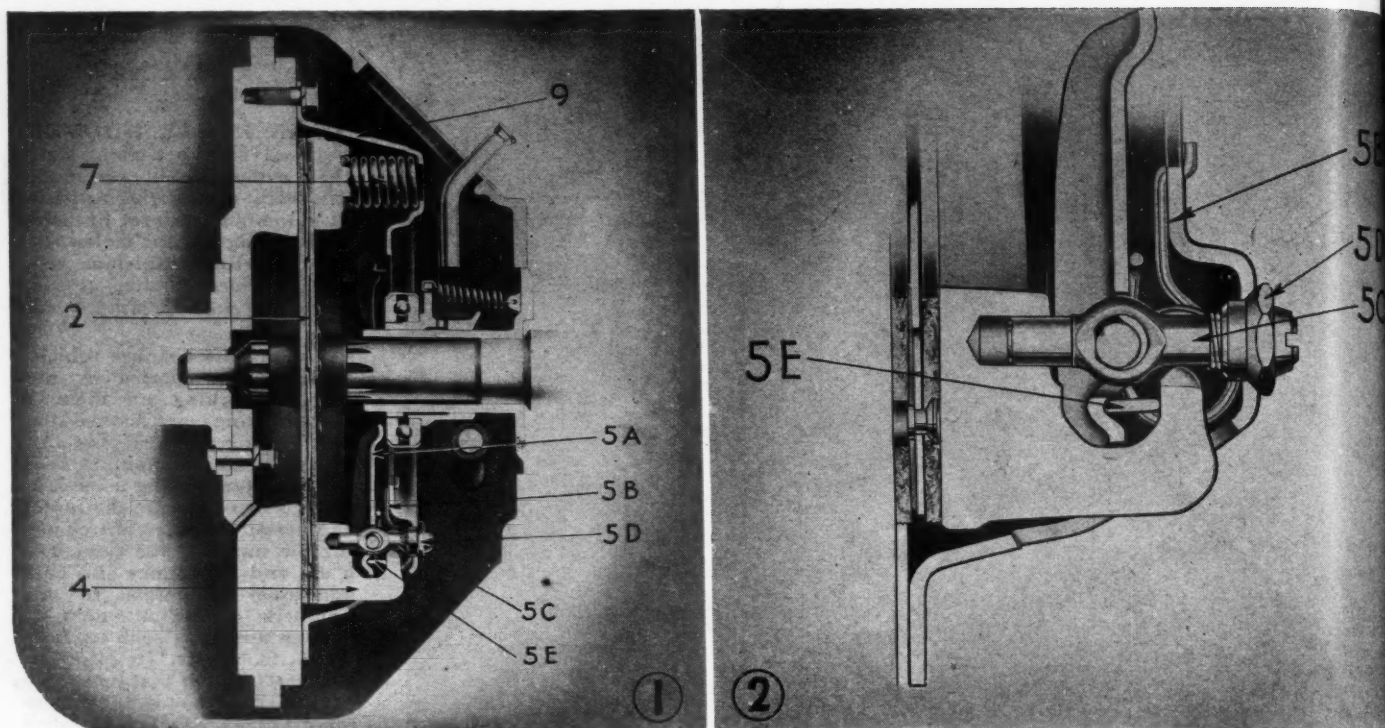
tion of Thomas H. Robinson on one of our broadcasts, and because of that description spotted Robinson when he entered the Pasadena drug store.

Where do service-station and repair shop operators fit into this

picture? What part can they play?

In the first place, I would suggest that they keep themselves as familiar as possible with the general situation: what men are wanted in what part of the country,

(Continued on page 55)



# How To Fix Clutches

**S**ERVICE procedure for the Borg & Beck clutches used on the 1937 model cars does not differ greatly from previous models. Refinements in construction contribute to smoother operation, accurate balancing of the assembled parts and improvements in clutch facing material to eliminate chatter are the outstanding features.

There are two types of construction used on the 1937 cars, one using a ball type release bearing and the other a carbon-graphite bearing. These are both of the single plate, dry disk type, with no adjustment for wear provided in the clutch itself. An individual adjustment is provided for locating each lever in manufacturing, but the adjusting nut is locked in place and should not be disturbed unless the clutch is disassembled.

The release bearing is mounted on the transmission, and when the clutch pedal is depressed the bearing is moved toward the flywheel and contacts the inner ends of the release levers 5-A (Fig. 1). In those cases where a graphite release bearing is used it contacts a

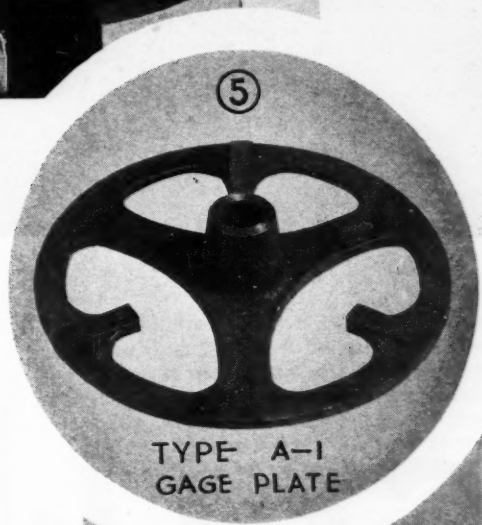
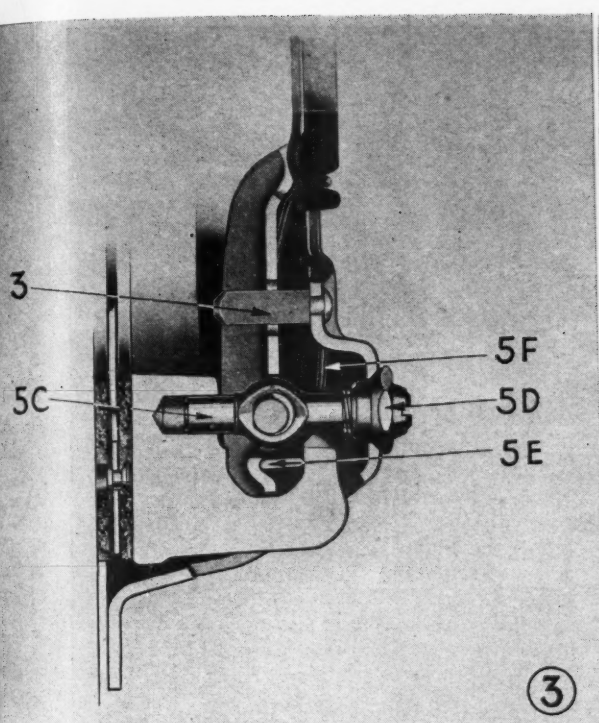
## Complete Instructions for Adjusting and Repairing Both Types of Borg & Beck Clutches on 1937 Cars

release lever plate which is attached to the levers 5-A. Each release lever is pivoted on a floating pin which remains stationary in the lever and rolls across a short flat portion of the enlarged hole in the eyebolt 5-C (Figs. 2 and 3). The outer ends of the eyebolts extend through holes in the clutch cover and are fitted with adjusting nuts by which each lever is located in the correct position. The outer ends of the release levers engage the pressure plate lugs by means of struts 5E, which provide knife edge contact between the outer ends of the levers and the pressure plate lugs, reducing friction at this point. The pressure plate (4) is thus pulled away from the driven plate (2), compressing the coil

springs (7), which are assembled between the pressure plate and the clutch cover (9).

As the clutch facings wear, the pressure plate moves closer to the flywheel face, and the outer ends of the release levers follow. This causes the inner ends of the levers to travel farther toward the release bearing, decreasing the clearance, which, of course, decreases the clearance or free travel of the clutch pedal. Since there is no adjustment provided in the clutch, pedal clearance, which should be 1 to 1½ in., is restored by adjusting the pedal linkage. No other adjustment is necessary and the adjusting nuts 5D (Figs. 2 and 3) should not be turned, as this would throw the pressure plate out of position





1. Sectional view of Borg & Beck Clutch
2. Finger and eyebolt assembly used with ball type release bearing
3. Finger and eyebolt assembly used with graphite release bearing
4. Assembling clutch in press
5. Type A-1 gage plate
6. Using gage plate to adjust clutch fingers

**By Harry Roberts**

and cause the clutch to chatter.

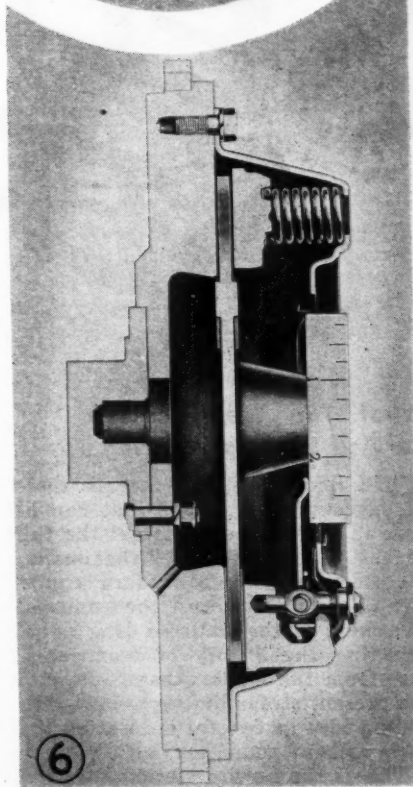
To remove and disassemble the clutch, first remove the transmission and clutch housing or pan, as the case may be. Mark the flywheel, cover and pressure plate so that these parts may be assembled in the same relative position. Loosen the screws holding the cover to the flywheel one turn at a time until the spring pressure is relieved. The screws can then be removed and the complete clutch lifted from the flywheel. Mark the outer face of the driven disk to avoid reversing it when reassembling. Next place the clutch assembly in a press, pressure plate down, with a block under the pressure plate arranged so that the cover is free to move downward. Place a block or bar across the top of the cover, resting on the spring bosses. Press the cover downward and while holding it remove the nuts 5D, and then release the pressure slowly to

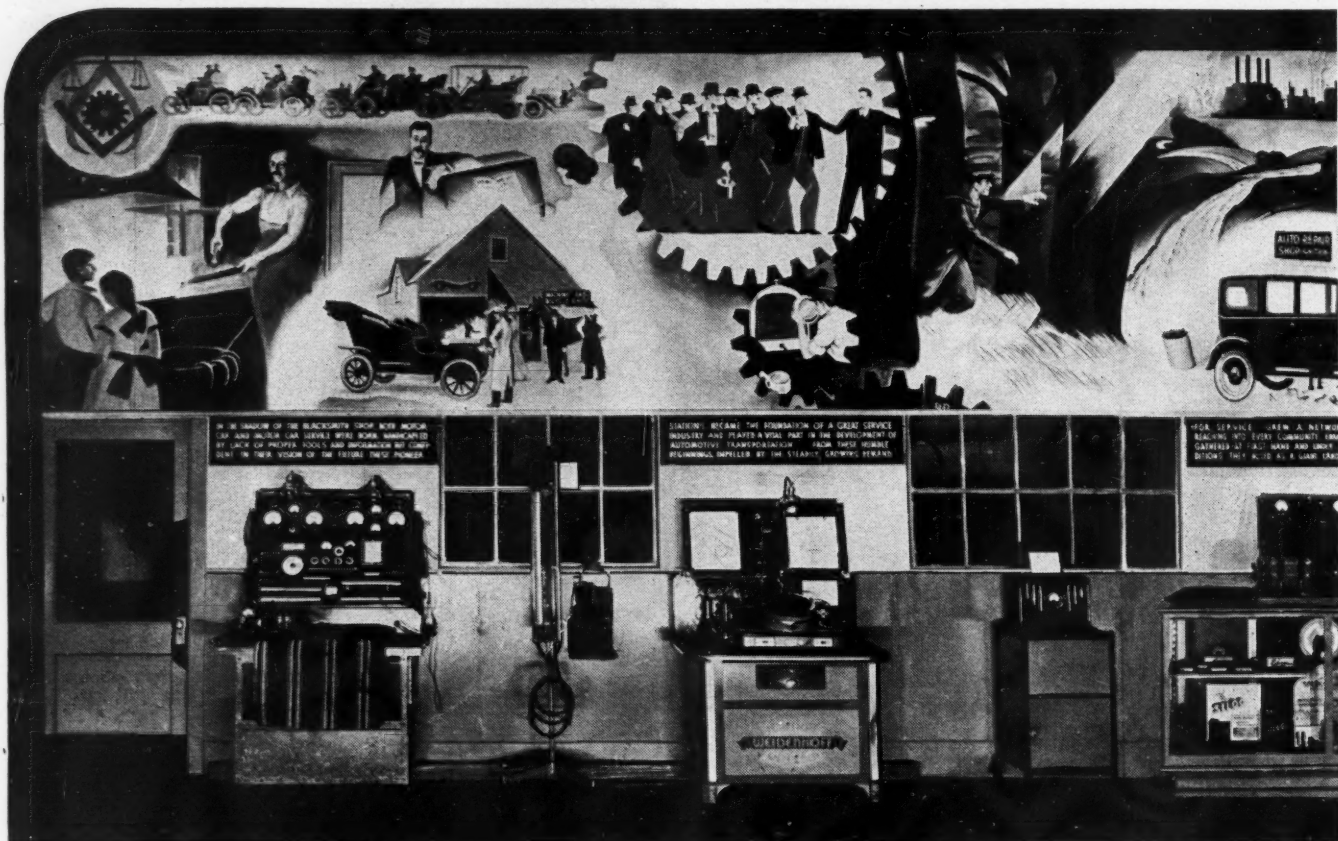
prevent the springs from flying out. The cover may then be lifted off and all parts will be exposed for inspection.

In removing release levers, hold them so that the inner ends of the levers and the upper ends of the eyebolts are as near together as possible, keeping the eyebolt pin seated in its socket in the lever. The strut may then be lifted over the ridge on the end of the lever, making it possible to lift the lever and eyebolt from the pressure plate.

In reassembling release levers, insert a strut in the slots of the pressure plate lug. Next drop the strut slightly and tilt it outward until the lower edge rests against the vertical milled surface of the lug. Then, holding a lever, eyebolt and pin assembled, with the end of the lever and the end of the eyebolt as close together as possible, insert

(Continued on page 54)





# SELLING SERVICE

By Frank P. Tighe

## What The Well-Dressed Service Shop Is Wearing

THE picture spread across these pages vividly shows what can be done in a service shop to get the full benefit of "display value" that manufacturers build into modern equipment. What's more, the unusual treatment of the walls—a long panel depicting the history of transportation from the old buckboard days to the present streamline age—may give you an idea or two for decorating the bare walls of your shop.

This is the service station operated

in connection with the Illinois Auto Electric Co. of Chicago. Joseph Sirotak, president of the company, planned the layout to show car owners what the completely equipped service station must have in the way of testing equipment, tune-up equipment and for other quick services.

When you consider that Mr. Sirotak started with a blank wall—just like any garage, anywhere—then painted it, paneled it, marked it, installed the huge mural painting atop the display of modern shop equipment, then you know the answer to the question, why car owners like to stop at the service

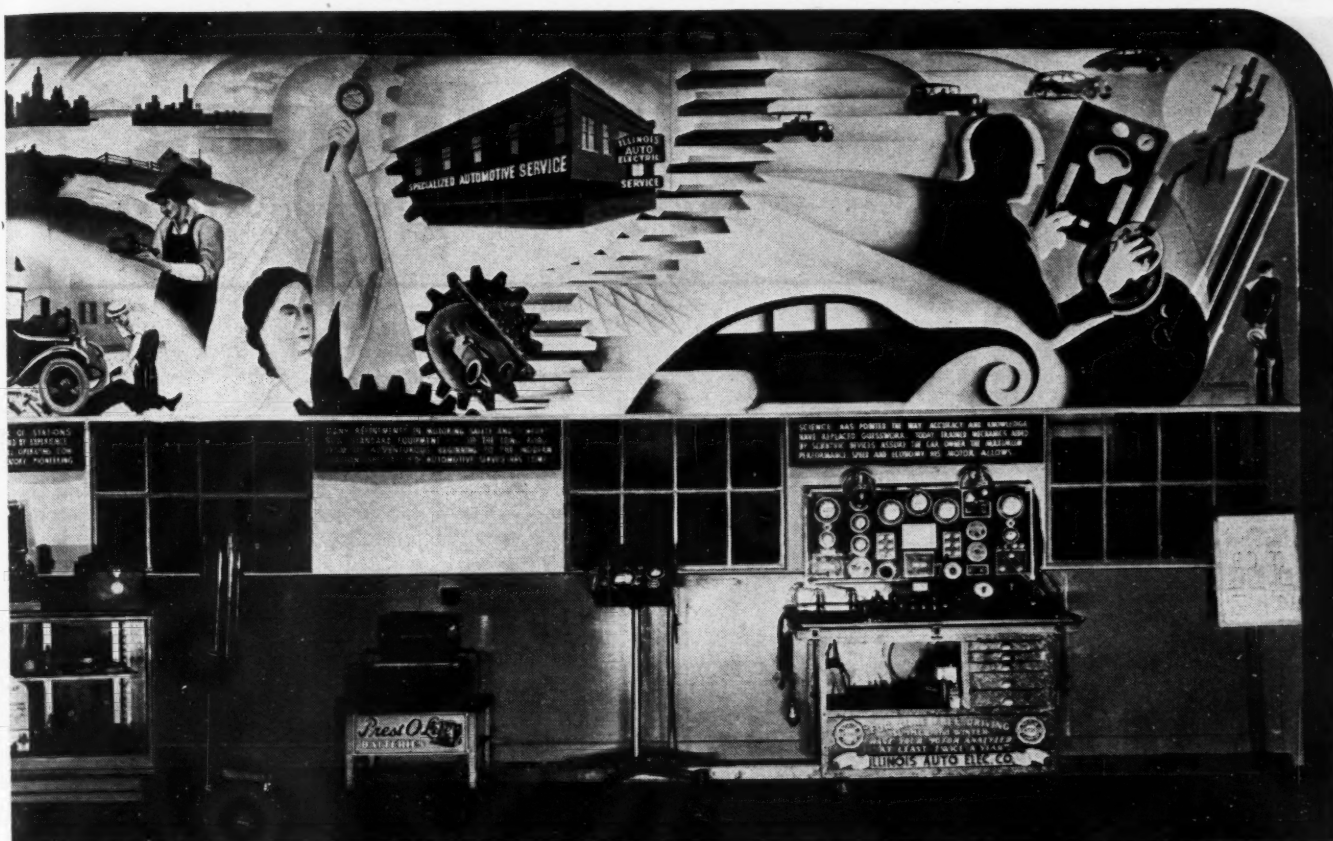
station of the Illinois Auto Electric Co. The equipment strung along the wall is identified with descriptive charts, giving the uses of each piece. And this method attracts customers, creates the impression of having complete facilities for all forms of automotive maintenance and pays a profit. In fact, last year's volume of business was double that of 1935. Cleanliness and orderliness are important counterparts in this plan, of course.



## Rural Employment Exchange Cultivates Farm Business

PAT BLINN, owner of Blinn's Garage, Trinway, Ohio, doesn't advise opening an employment agency but has a plan to help other folks get work. The plan started two years ago with owners of tractors, trucks, and trailers, who wanted part-time jobs. Blinn got the habit of recording the names of such persons, along with the type of work they wanted to do. At the same time he placed in local news-





**T**HESE are practical merchandising ideas that have been used by maintenance men—just like yourself. Workable ideas gathered from here, there and everywhere and presented for practical application to your business. Use them and write us your experience for publication herein.

papers an advertisement arranged thus:

#### Rural Contracting Service

Farmers, if you are behind with your plowing, need hauling done, stone crushed, or that long-neglected lane or barn-lot paved, come to Blinn's Garage.

We have competent men with equipment ready to do these and similar motor jobs, and our part of the service will cost you nothing.

Pat Blinn, Owner.

Farmers, road-workers, and other rural tradespeople soon got the habit of calling at the garage for the advertised help, and Blinn referred each caller to the names on the list. Blinn took no further part in the transaction, but his shop gradually became a get-together point for motor contractors and persons who wanted work done. As conditions improved and motor equipment increased there was a marked rise in sales of spare parts,

gas, oil, and reconditioned cars and trucks. During the past year, increased business from this source alone amounted to more than 40 per cent.

"Farm contracting is a new term in rural sections," Blinn explained. "Scores of farmers are cashing in on tractors and trucks by doing spare-time work for neighbors, and fully as many town workers are reaping good wages from odd jobs in the country. This exchange of labor is increasing in all rural districts.



"I put my plan into action by providing a large loose-leaf ledger, upon which both farmers and townspeople may advertise the kind of work they are fitted to do. This book is placed on a counter near the door, where it may be consulted by any one at any time. Last year there were so many calls, that a 3 x 5 foot section of blackboard was used in connection with the book. I make no charge for the advertising, nor do I assume any responsibility for contracts. Folks meet at my shop to arrange the jobs

without interfering with my regular duties, but you may be sure that the service is not forgotten. Advertisers on my books bring their motor business to me, and the farmers never forget to take home gas, oil, and spare parts for their home-power equipment.

#### The Perfect Serviceman!

**J**OBBER salesmen who entered the recent N. S. P. A. "Question and Answer Contest" were asked to "Give five reasons for the success of the most progressive garage you know."

One of the prize winners, Frank Wood, who sells for Standard Battery & Electric Co. of Waterloo, Iowa, described his best customer as follows:

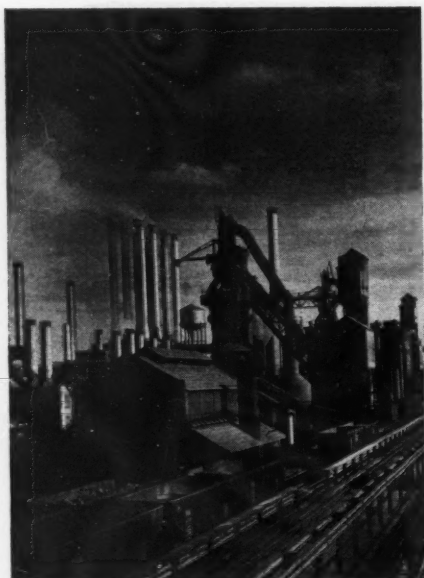
"The owner is always on the job, personally meeting and talking to each customer.

"His shop is well equipped with everything necessary to operate efficiently.

"He has meetings of his employees at which he instructs them how to do their work, what to say and what not to say to customers.

"He is a merchandiser as well as a repairman and knows that a little 'chin music' will coax more customers' dollars into the cash register than hours of tinkering with a wrench and screw driver.

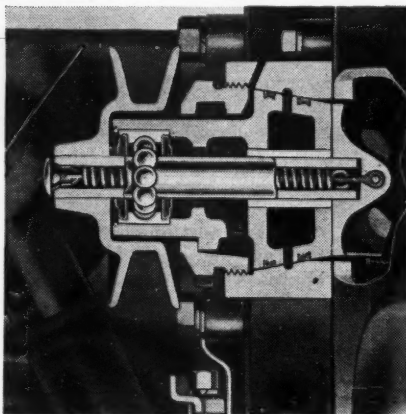
"He is careful to see that all parts he puts into his customers' cars are of the best quality. He stays clear of gyp parts."



# Flat Rating

*The Factory Service Hints*

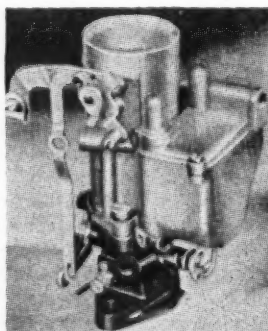
**S**HOULD it become necessary to remove and overhaul the water pump (Flat Rate Operation C-12) of the 1937 Ford engine, it is very important that a careful inspection be made for any foreign substance in the cooling system that could be forced, either by water circulation or by road conditions, into the water



pump. It is best to reverse-flush the engine, with the pumps and hose connections removed, and in the case of breakage of pump impellers check through the inlet connections and water pump holes with a small light to be sure that all broken parts have been removed.

\* \* \*

**I**MPROVEMENTS in gasoline economy of the 1937 Graham Supercharger Model 116 and 120 have been made, starting at Chassis No. 132010 for the 116 Model and at Chassis No.

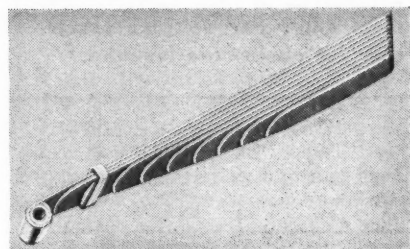


120069 and 110988 for the 120 Model. Improvement consists of changing the carburetor power jet and the economizer spring. The new power jet is marked 730—there is no marking on the economizer spring. Check to be sure that the metering pin is marked 109 when making this change.

The same change went into production at Chassis No. 217715 on the Cavalier Model 85. The new power jet is marked 600, and the metering pin is 110. Flat Rate Operation D-7 should be applied when performing this work.

\* \* \*

**I**N the event that cases are encountered with the 1937 Plymouth Model P-3 diving to the left when the brakes are applied, this condition can be corrected by replacing the left steering knuckle arm and the left front spring. The new arm has the ball stud end raised about  $\frac{3}{8}$  in. and the new spring has the rear eye turned down-



ward. Flat Rate Operations A-7y and S-7 cover this work.

\* \* \*

**A** KNOCK or a binding condition in the steering gear of the 1937 Studebaker may be caused by misalignment of the assembly. If proper lubrication and adjustment does not eliminate the condition, loosen the steering gear to case frame bolt and permit the assembly to align itself naturally. Tighten the dash bracket screw and be sure that the anti-squeak between the post bracket and the instrument board is in proper position. This work is covered by Flat Rate Operation A-17.

**W**HEN performing Flat Rate Operation F-13, "Remove and reinstall oil pan" on the 1937 Chrysler Models C-14, C-15 and C-16, it is not necessary to drill holes in the front cross member to reach the two front retaining bolts. Use a  $\frac{1}{2}$  in. 12-point closed end wrench that has been cut so that the handle is about 4 in. long. To reach the bolt on the right side it will be much easier if the fuel pump is removed. Turn the engine until No. 1 piston is  $\frac{1}{2}$  way up in the cylinder, to allow clearance to slide the pan to the rear of the car to clear the frame cross member. Be sure that a new gasket is cemented to the pan at the front and rear before it is reinstalled—otherwise a leak is apt to develop at these points.

\* \* \*

**C**ONNECTIONS of the Fram Cleaner on the 1937 Graham Supercharger models should be checked to be sure that the line from the T connection on the side of the motor is attached to the inlet connection on the side of the Fram Cleaner, and that the tube from the connection on the bottom of the Fram Cleaner leads to the connection on the rear of the cylinder block.

\* \* \*

**A** SMALL cover has been provided to prevent mud from entering the hole in the brake cross shaft bracket on the 1937 Model Ford cars. These covers will be installed without charge by Ford dealers on all cars not so equipped. This hole is being plugged in present production.

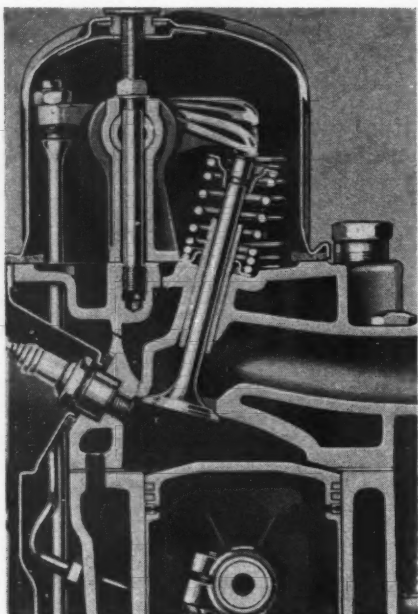




# The READERS' CLEARING HOUSE

**T**HIS department is written by the readers of Motor Age themselves! It presents their questions, their problems together with the practical analysis of the difficulties and replies from Bill Toboldt (left), editor of Motor Age and "Hank" Hankinson (right), technical editor. Read the Clearing House—then write us!

# "It's My Turn To Call For Help"



I have been a reader of *MOTOR AGE* for some time and look forward each month to my brothers' troubles in *Readers' Clearing House*. This time it is my turn to call for help. I am having trouble with a 1935 Master Six Chevrolet coupe which will not accelerate from 10 to 20 m.p.h. The car idles perfectly and runs fine at high speed but if the throttle is instantly opened when running slow, when car is on road, the motor seems to miss, spit back into the carburetor and vibrate terribly until it finally reaches about 20 m.p.h. and then it will go on fairly well.

I have done almost every practical thing I can think of but to no advantage. I have checked everything in the ignition system and ignition checks perfect on test stand with all tests. Have cleaned and checked carburetor and set float level to manufacturer's specifications. The accelerating pump shoots a good stream of gas. Have checked the compression of each cylinder and it runs from 90 to 95 lb. at cranking speed. Have tested vacuum when motor is in shop and reads O. K. Test shows 18 in. at idle and when throttle is opened and closed quickly it drops to 2 and comes back to about 25. When motor runs at speed equivalent to 25 m.p.h. the vacuum is up to 19 in. What makes it so hard to locate is that in the shop it operates perfectly but get it on the road and you are out of luck. The motor starts fine in any weather and doesn't seem to give this trouble any more cold than it does hot. Conditions of trouble are same at any temperature.

There are only two things which I have left to try but would like to know if you believe will do any good. The automatic heat valve in the manifold is stuck in the cold motor position. Would this have much if any bearing upon it? Also, it seems to me when, after setting octane selector at zero and setting timing by steel ball in flywheel with neon light, that as you accelerate the motor quickly, the distributor advances very rapidly without hesitating and mark passes down the flywheel out of sight at once. Do you suppose a new vacuum diaphragm unit would help any?

I will certainly appreciate any help on this job as it sure is "getting me down." I have licked plenty of tough problems in motors in the last ten years but I never struck one quite like this. Elmer C. Hecox, Service Mgr., R. W. Bort Auto Co., Lyons, N. Y.

**R**IGHT off the bat I'd say that this trouble is caused by leaking inlet valve guides. At idling speed this trouble can be compensated for by a richer carburetor adjustment, but during a low-speed acceleration the mixture is leaned out by the air coming past the valve stem. At high speed the vacuum is not great enough to cause a noticeable effect. Installing new valve guides should go a long way toward eliminating this trouble.

Another possible cause is the use of a metering rod that is too lean. The standard rod for this carburetor is stamped with the figures 65A-46, and the lean rod is stamped with the figures 66-50. If this car has the lean metering rod it will act very much as you described.

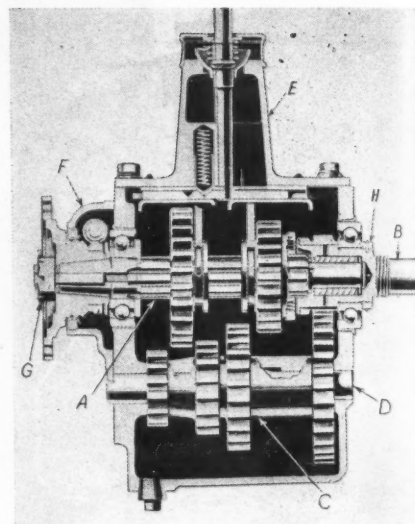
Spark plug gaps should be set at .032 in. and the breaker points at .018 in. Be sure to check the spark plug gaps with a wire gage rather than a flat gage unless the plugs are brand new.

I do not believe the diaphragm in the octane selector is a contributing factor to this condition. The manifold heat control valve, however, would have a tendency to make the engine sluggish, particularly after it has become thoroughly warmed up, and it would also have a tendency to retard the high speed performance. I believe it would be well for you to free up this valve so that it will operate properly.

**When Trouble Troubles**

**YOU**

**Write The Readers'  
Clearing House**



## FINDS PERIODIC NOISE IN TRANSMISSION

Can you help us any with a noise in a F-29 Oldsmobile six cylinder? The trouble is described below: When this noise first came in the car we thought it was transmission bearings and we took the transmission down and replaced the only bad bearing in same. There was an idler gear and idler and cluster shafts that did not look good so we put the transmission back in and ordered these parts. When they came we put them in. Neither of these helped the noise any. We then installed all new transmission bearings. Still the same noise. We have had several mechanics besides our own check this and all agree that it sounds like transmission bearings. This noise comes in at 25 miles per hour and stays there until 30 miles per hour when it goes out.

When the above did not remedy the trouble, we started guessing and took the differential down and installed new pinion and differential carrier bearings. We put the differential carrier in a lathe to check for trueness. This car has always had some rear end noise. Twice or three times new pinion and ring gears have been installed and never was it possible to get all the noise out. It can be adjusted so the noise will be there at any speed but it cannot be adjusted so that the noise is not there at some speed. The rear axle housing has been checked and is true. However, this noise is not so bad, and we are merely mentioning it so you will know all the facts in connection with this other noise, as often a transmission and rear end noise are hard to tell apart.





"What'll I charge 'im? His cow busted her horns jumpin' a fence an' I put on a new pair for him."

Now when we had no luck with the transmission and had gone over the rear end we then installed a new front universal (fabric) and a new clutch disk. These had no effect on the noise. The propeller shaft runs within 1/32 in. of being true. The spider gears are pretty well worn but we see no reason why these would cause this noise on a straight away pull. The noise is only on the pull.

Next we secured an old transmission from a junk yard. On this old transmission the case hardening was worn through in spots on all the gears. When the bearings were washed off with kerosene they made an awful noise that any mechanic would not put them back in but would recommend new ones. This transmission nearly corrected our trouble on the road. However, this same noise was there at exactly 27 miles per hour but not so loud as on the original transmission. Also, it was almost impossible to keep this noise there on this junk transmission. In other words, it came in just for a second or two when passing through 27 miles per hour. Letting up on the throttle it was almost impossible to keep it at the right speed for the noise.

Heavy grease was tried in both transmissions and for a few blocks it would help on both. As soon as the car had run a short distance these noises started again.

Don't believe I mentioned above that several mechanics have inspected the gears and all agree that there should be no noise from them. They look O. K. and there is very little play—not as much as would ordinarily be found in any transmission that had run some distance.

We have come to the point that the only thing we see to do is to put all new gears in the transmission. We cannot see why this should stop the trouble and we don't like to do this and put this much money in them unless we feel pretty sure that it would stop the noise. M. H. Jess, M. Jess Auto Shops, 447 South Campbell Avenue, Springfield, Mo.

I NOTICE that you replaced the cluster gear shaft and it has been my experience that when a shaft replacement is necessary there is considerable wear in the bushings inside the cluster gear and they also should be replaced. Unfortunately, these bushings are not furnished by the factory and it is necessary to buy the complete cluster gear and bushing assembly. This model car was not supplied with thrust washers in between each end of the cluster gear and the transmission case, and as a result sometimes developed end-play at these points. Starting with the 1931 model, thrust washers were supplied and it may be that if you would purchase two of these thrust washers and dress them off to the proper thickness, they could be installed in the 1929 model and eliminate this end-play. Both of these conditions, that is the worn bushings and excessive end-play of the gear, would cause the periodic noise you are experiencing.

Another suggestion which I think would be of assistance is that you replace the rubber engine mountings. According to your description, this noise comes in at a certain car speed and goes out above that speed which seems to indicate that it is a periodic vibration which might very well be

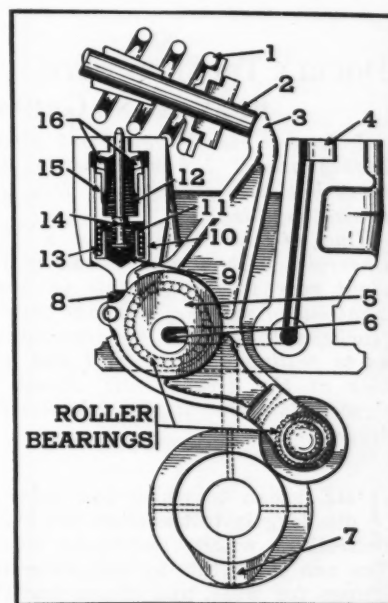
caused by the engine vibration periods. Installing new rubber engine mountings would have a tendency to smooth out this period and not transmit it through the transmission so that this noise could be set up.

My suggestions, therefore, consist of installing either a new cluster gear or new bushings in the old cluster gear, installing thrust washers at the front and back of the cluster gear and replacing the engine mountings. It seems to me that this work is the least expensive and should be done before you go to the expense of a complete set of gears.

## HOW TO ADJUST AUTOMATIC SILENCER

I have a 12-cylinder 1935 Packard coming in for a valve and carbon job and it is not quite clear to me just how to adjust the valves and tappets on this car. Can you help me out? I. Y. Chiswell, 2303 Fourteenth Street, N. W., Washington, D. C.

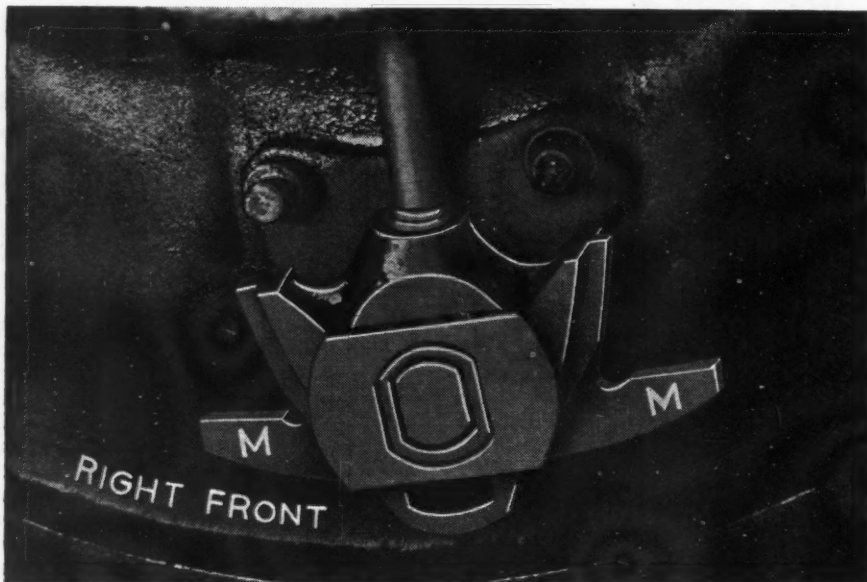
YOU have noticed, of course, that the automatic valve silencer has a plunger extending above its body. When grinding valves against their seats, be sure that the rocker arm is resting against the low point of the cam on the camshaft. This is one revolution of the crankshaft after the valve has been wide open. In addition to this point, the valve silencer plunger mentioned above must be



pushed down to allow the oil to bleed out of the assembly. This can be done with the finger or with a piece of 1-in. cold rolled stock about 4 in. long. In other words, when grinding the valve and seat you must be sure that the valve is actually resting on its seat, and is not being held away by the automatic valve adjuster.

Checking the valve tappet clearance is done in the same manner; that is, with the rocker arm on the low side of the cam and the valve silencer

plunger pushed down. Push the rocker arm away from the end of the valve stem with the hand and check the gap between it and the valve stem. This should be not less than .030 in. or more than .055 in. If the clearance is less than .030 in., remove the valve and carefully grind off the end of the valve stem until the proper clearance is obtained. A clearance of .035 in. is desired. No means of adjustment is provided other than grinding the end of the stem.



## DOUBLE TROUBLE WITH BRAKES AND GREASE

*I have a new 1936 Ford whose brakes groan. I have tried to stop them but they still groan. Can you advise anything?*

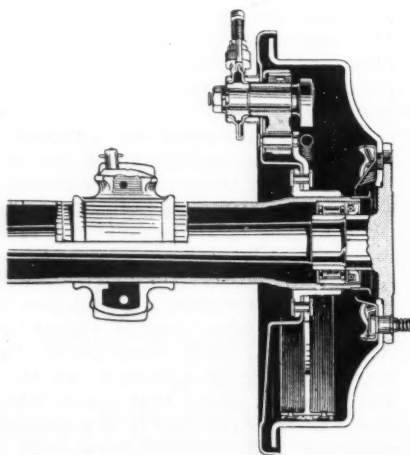
One of the owners has a 1936 Chevrolet with a grease leak in the right rear wheel. As this is somewhat out of my line, as I take care of trucks, will you give me instructions as to pulling off the wheel and getting at the grease seal? Ansel B. Grose, 75 Central St., Somerville, Mass.

THE groan to which you refer is due largely to the shoes not being centralized within the brake drum. You can check this by inspecting the linings for wear, and if you find the wear is greater on the lower end of the rear shoes of the front brakes than it is on the upper end, it indicates the shoes are setting too low on the backing plate. The brake shoes may be raised by bending up the ears of the shoe rest stampings, which are indicated by the letter M on the illustration. If centralizing the shoes does not entirely eliminate the groan, I would suggest that you chamfer the lining on the bottom end of both shoes to a distance of about 3 inches from the end. This will have the

effect of relieving the toe contact of the shoe and will assist in eliminating this groaning noise.

The second paragraph of your letter, dealing with a grease leak in the rear wheel of a 1936 Chevrolet, requires that the leather oil seal on the axle shaft, just inside of the axle housing, be replaced. In order to do this, it is necessary that you first remove the wheel from the brake drum and then remove the differential housing cover after first draining the oil

from the differential. Then, remove the pinion lock screw and the differential pinion shaft which, of course, means removing the axle shaft spacer also. Push the axle shaft in toward the center of the housing so that it is possible to remove the U-washer from the end of the axle shaft. After the U-washer has been removed, the axle shaft may then be removed from the axle housing. It is not necessary to pull rear wheel hub and brake drum from the axle shaft. After the shaft is removed from the housing, it is a simple matter to remove and re-install the leather oil seal.



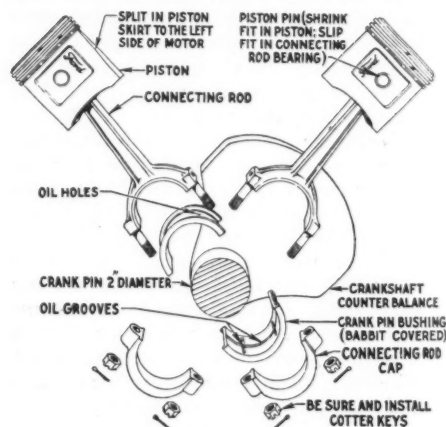
## ENGINE STILL KNOCKS AFTER OVERHAULING

*I have a customer whose 1932 V-8 Ford No. 18-163808 has caused me much grief and I am hoping you can assist me to clear up the trouble. It still has low mileage and has not been abused.*

At 30,000 miles it developed a bearing knock. Replacement was made with the new type ones of bronze-lead material. Within 1500 miles these new bearings had started knocking. In the meantime, I had cleaned carbon, ground valves, installed new rings and a new distributor. What is causing the knock in the new bearings, and if you consider the cause to be normal wear, is it possible to adjust them to remove the knock?

This same car had an exchange carburetor put on it 6000 miles back but the new ring and valve job hasn't even influenced the gas economy. Around 10 m.p.h. seems to be the best I can adjust it to. The customer is considering having me install a different make. Of course, I think the exchange one should be adjustable for better than 10 m.p.h. but if you can't help me there, then advise me whether another make would be a good change. A Virginia Subscriber.

UNDOUBTEDLY, the fact that the new connecting rod bearings started knocking again in 1500 miles is due to the fact that the crankshaft

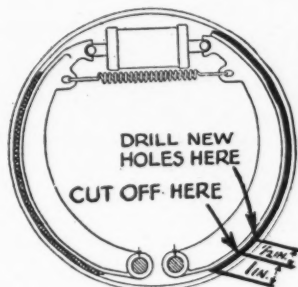


bearing journals are worn out-of-round. If this is true, no amount of adjusting will correct the trouble and the only thing that can be done is to turn the journals down so that they are absolutely round or else replace the crankshaft. My suggestion is that you check these bearing journals with a micrometer to determine just how much wear has taken place. If the journals are more than .002 of an inch out-of-round, the above work will have to be performed before you will be able to get a properly fitted bearing.

There are so many factors that affect gasoline consumption other than simply the carburetor, that it will be necessary for you to check this engine completely in order to determine the



source of the trouble in this particular case. The first thing I would do is check the compression since I notice that this car had 30,000 miles of service when you installed new rings. It is quite possible that the cylinders are worn out-of-round in which case it is doubtful that the new rings are making a good seal. Spark plugs, points, ignition timing, valve lash, brake adjustment, grade of oil used and the condition of the muffler are all points that will have to be checked before the trouble can be traced directly to the carburetor. I do not believe it would be of assistance to change the make of the carburetor.



### CORRECTION FOR BRAKE CHATTER

I have a 1934 model Graham that is giving trouble with the brakes. On a normal application they work fine, but a sudden application at high speed causes the front brakes to chatter and sometimes lock. I have checked the adjustment carefully and am unable to find anything that could cause this condition. Have you any suggestions? A North Carolina Subscriber.

**I**F you will examine the brake lining at the lower ends of the forward shoe of the front brakes you will find that it is worn more than the rest of the lining. This indicates that this

part of the shoe is contacting the drum first, and on a normal application is supplying most of the braking force. During a hard application the shoe will chatter and then grab as the pedal pressure is increased.

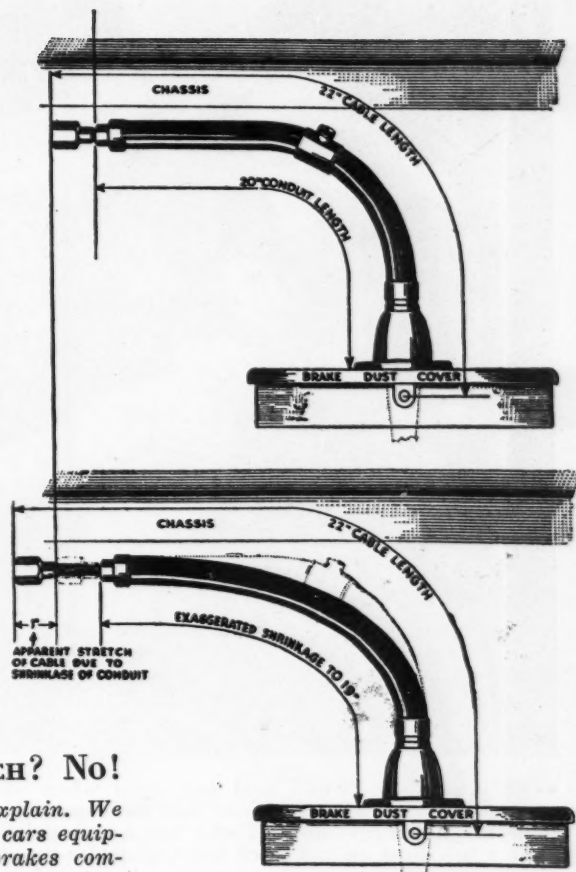
The correction is to cut off 1 in. of the lining at this point, drill two holes through the lining and shoe  $\frac{1}{2}$  in. from the cut and install new rivets to hold the new end of the lining. I am sure you will find that this will correct this condition.

It is understood, of course, that this correction is to be applied only after care has been exercised in securing the proper brake adjustment.

### DO BRAKE CABLES STRETCH? No!

Here's one for you to explain. We have had several cases of cars equipped with cable-operated brakes coming in for adjustment. Upon examination it was found that the cables had stretched so much that all the adjustment was taken up, and it was necessary to install new cables. Yet, when the new cables were installed, they were too long. This condition is not confined to one make of car, but to any equipped with cable-operated brakes, and we are sure that the new cables we have are the correct ones for any particular make of car. Why is it that the cable has apparently stretched so that all the adjustment is taken up, and yet the old cable is no longer than the new one?

A Pennsylvania Subscriber.



**M**ANY thanks for your letter—it brings up a very interesting point, and maybe this will help to straighten out a mistaken idea in the minds of many.

In the first place, the cable doesn't stretch—you proved this to yourself when you discovered that the new cable was the same length as the old. The reason that the old one appears longer is that the conduit has shrunk. The conduit is placed around the cable because the cable does not exert a direct pull from the point where the pulling effort is applied, to the brake shoe operating cam. In other words, the cable has to pull "around a corner," so to speak, and the conduit provides the "corner." Naturally, the cable tries to straighten out as it is pulled, and this constant effort eventually causes the conduit to assume a straighter line between the points where it is fastened to the frame and the brake backing plate. This destroys the "corner," and then the cable appears to be too long because it has a lesser distance to cover. This is very clearly shown in the accompanying illustrations.

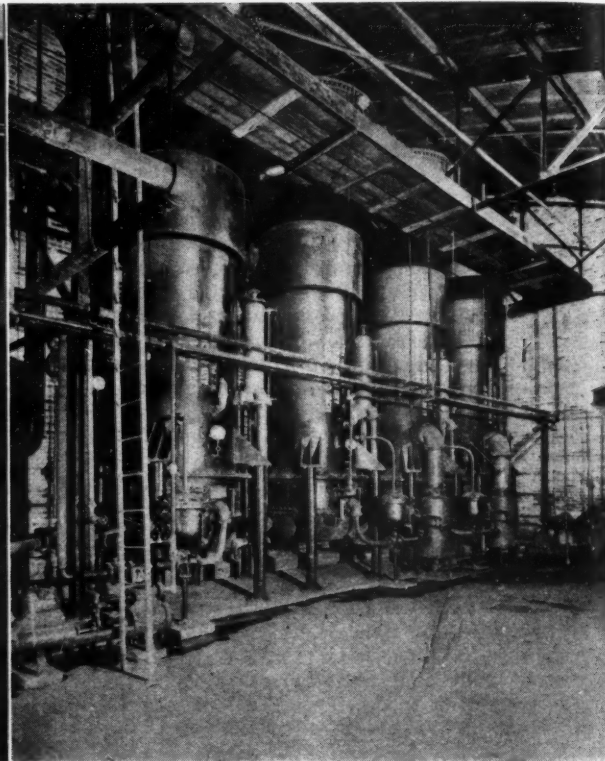
And while we are on the subject of brake cables, let me remind you that brake cables should be lubricated periodically. This is a legitimate service operation, and one in which there is a nice profit. It can be sold with either a lubrication job or a brake adjusting job, and you'd be surprised the amount of business you can develop if you will just remind your customers of this important operation.



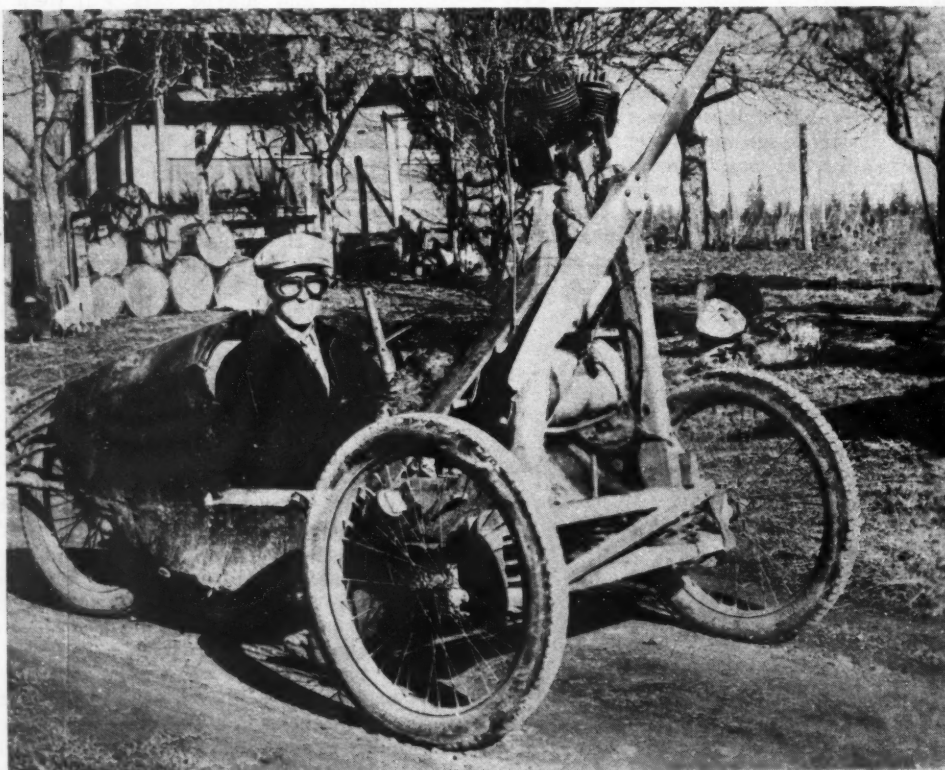
"You're my first customer. In fact, this is the first car I ever worked on."



**“Wow”** “Wow” said our artist when we handed him this photo. “Wow” said the engraver and the printer. We hope the Broadway showgirl who had her Social Security number indelibly inscribed on her knee has sufficiently “wowed” everybody—so that we can now go back to work. Anyway there’s an idea for the mechanic who can’t remember what his Social Security number is



**Auto Alky** The first auto alcohol plant in the U. S. began production at Atchison, Kan., recently. From lower grade grains, cull potatoes, artichokes and other farm products an alcohol blended gasoline is being made



**Practically Hash** This one wins the fur-lined cylinder block. Willie Menkenns, of Hillsboro, Ore., concocted this hybrid auto using everything but the kitchen sink, well, almost everything. It has an airplane propeller, a motorcycle engine, three wheels, an automobile steering wheel—with everything brought together in modern streamline effect. They say, she’ll do 55 m.p.h.



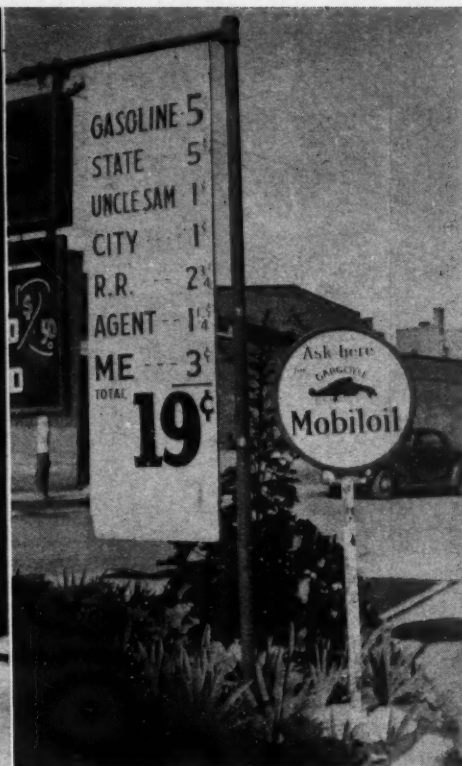
**Fires Tires** Old auto tires came in handy to augment the heat from smudge pots when cold weather struck the citrus belt, in California



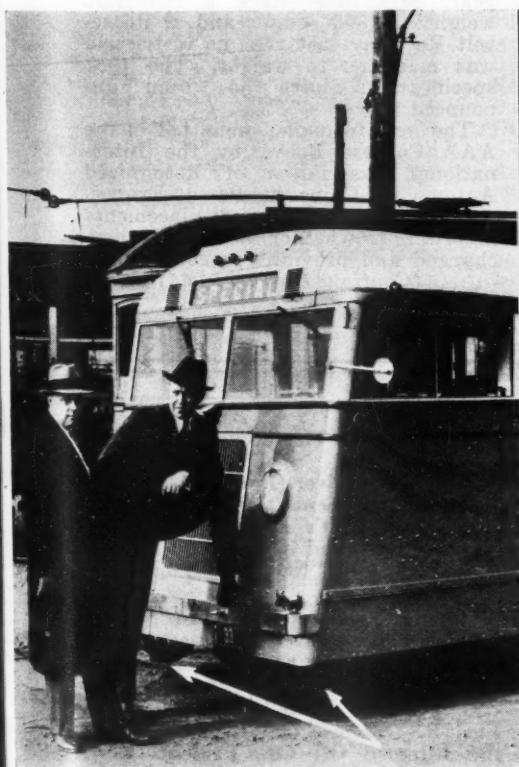


## Heads Together

Two leaders in their respective fields, K. T. Keller, president of Chrysler Corp., and Dr. Hugo Eckner, famous German airship builder and commander, photographed in quiet conversation at the recent S. A. E. meeting, in Detroit, at which Dr. Eckner spoke. A new era of transoceanic transportation may be one of the consequences of Dr. Eckner's latest visit to the United States



**"Me-3¢"** This sign outside a filling station in Santa Fe, New Mexico, not only tells customers how much gasoline is—it also tells why! Gas listed at 19 cents, the sign gives all the costs and finally "Me-3¢"



## Auto-Railers

The first rail-to-highway coaches are being used on the Arlington & Fairfax Railway, Washington, D. C. Power is supplied through Chevrolet chassis



## Flood Ravages

Floods swept through the valleys of the Missouri and Mississippi rivers and their subsidiaries, last month—leaving a trail of suffering and desolation. People affected by this unprecedented condition now face the great task of rehabilitation. This photo typifies how automobiles are being damaged by rising flood tides



## International Race Formula O.k'd by A.A.A.

### Contest Board Approves New Regulations for 1938-39-40

The most radical change in racing cars since the present two-man mounts replaced the trim single seaters back in 1930 looms for America's speedways in 1938 as a result of adoption of a new International Formula by the Contest Board of the American Automobile Association, governing body of the sport in the country.

At its annual meeting in New York City, Jan. 17-18, the AAA Contest Board approved the new International Formula which alters the present maximum piston displacement of 366 cu. in. allowed for racing cars in the United States. The new Formula, which does not become effective until after the 1937 season, will govern the sport for three years, 1938-39-40.

Under requirements of the new rules, a wholesale revision of all of the expensive speed creations appearing at Indianapolis, Roosevelt Raceway and other major tracks, would be necessary. Fixing the displacement according to whether the car is supercharged, the new specifications restrict the displacement to an outside limit of 274.59 cu. in., nearly 100 in. smaller than the present maximum. The cars must scale at least 1,873.91 pounds when the maximum displacement is utilized. At Indianapolis this year, cars must have a minimum weight of 1800 pounds and at Roosevelt Raceway last year no restriction was made as to weight. The 1937 specifications have not been announced as yet.

The new formula, submitted to the AAA Contest Board by the International Association of Recognized Automobile Clubs at Paris, France, sets a scale of piston displacements according to whether the car is supercharged and providing a correspond-

(Continued on page 65)

#### Down The Column:

This truck driver operates his tail lights for the benefit of motorists behind him. If it's all clear ahead he signals "OK" and if it isn't he flashes "NO"

A modern service station in Minneapolis, made entirely of glass block presents a striking appearance at night as well as during the day

Earl B. Gilmore (left) president of the Gilmore Oil Co., presents Clay Moore, driver of a Graham Supercharger 116 sedan with the trophy for winning the Gilmore-Los Angeles-Yosemite Economy Sweepstakes



## Curtiss Succeeds Blanchard In Post As Editor of Automobile Trade Journal



Elliott Curtiss, Jr.  
Editor, Automobile Trade Journal

Elliott Curtiss, Jr., managing editor of *Automobile Trade Journal* since 1935, and former associate in the administration of the Motor Vehicle Retail Trade Code in Pennsylvania, has been named Editor of *Automobile Trade Journal* to succeed Don Blanchard who resigned last month.

Mr. Curtiss, whose experience is wide and varied in the automobile retailing field, brings to readers of *Automobile Trade Journal* an intimate knowledge and understanding of car dealers' problems from sales to service, having worked in the retail automobile business for several years.

During code administration and after the collapse of the NRA, he was editor of *P. A. A. News*, organ of the Pennsylvania Automotive Assn. At that time he established an intimate contact with leading dealers all over the country and has maintained that close association since then.

Mr. Curtiss attended the Wharton School of the University of Pennsylvania and prior to entering automobile retailing had spent eight years in the banking and brokerage business.

## Colwell Named Thompson Products Vice-President

Archie T. Colwell, director of engineering for Thompson Products, Inc., since 1930, has been made vice-president of the company in charge of engineering. Fred C. Crawford, president, said the promotion recognizes Col-



well's development work on important engine and chassis parts which have been widely adopted by aeronautical and automotive builders. The new vice-president will supervise the engineering activities of Thompson Products plants in Cleveland, Detroit and St. Catharines, Ontario.

## 3/4-Ton Truck Added

A new line of 3/4-ton commercial cars, known as the "Big Boy" line and designed to serve in the wide field existing between present types of commercial cars and the larger trucks, is announced by Hudson Motor Car Co.

The new commercial cars in four models will be additions to Hudson's 1937 lines of Terraplane models which already include two lines of passenger cars and the Standard Six line of commercial cars, it was announced.

The "Big Boy" models will be presented on a 124-in. wheelbase as compared with the 117-in. wheelbase of the standard Terraplane commercial car models.

## San Francisco Show

Plans are now under way for an Automotive Maintenance Show to be held in the Civic Auditorium, San Francisco, May 20-23. The clinic is under the sponsorship of the Automotive Booster Club, Golden Gate B-10, according to announcement by Ken M. Morse, president of the club. Boosters of Los Angeles, Seattle and Denver are also cooperating.

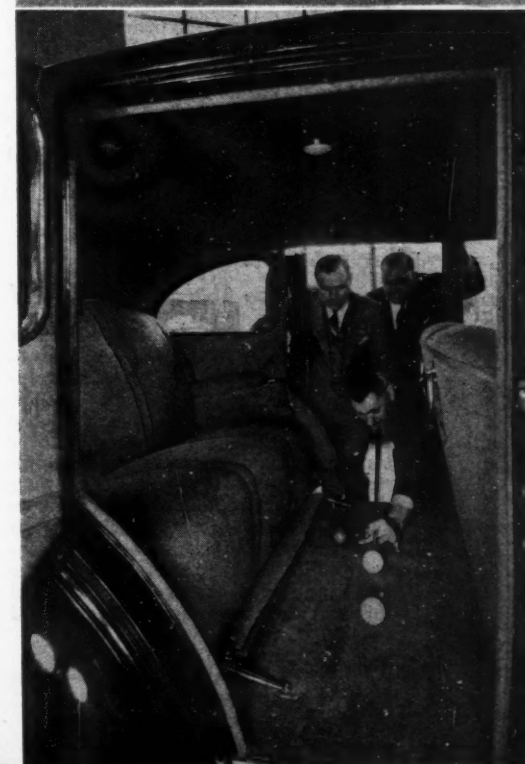
J. M. Noble, who managed the Los Angeles Maintenance Show last year, is show manager of the San Francisco demonstration. Robert E. McGill, Pacific Coast regional vice-president of the Automotive Booster Club International, is chairman of the Show Executive Committee.

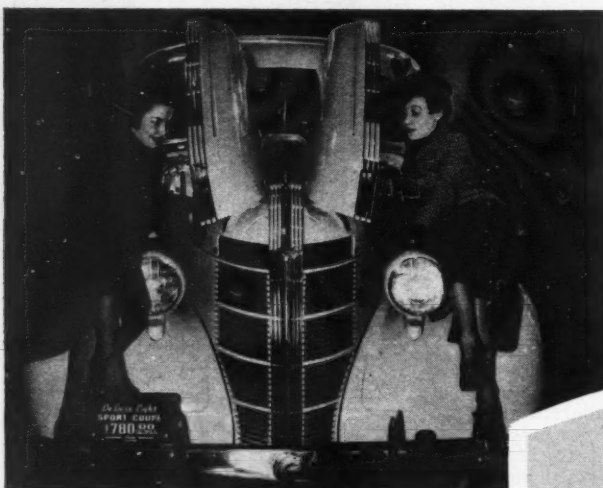
## Down The Column:

One of the features of the Bender Travel Mansions is this room-in-a-room—a utility cabinet, wardrobe and shower stall all rolled into one. The lady isn't standard equipment

Mr. Kool goes to town. To advertise "Kool" cigarettes, a circus dwarf dressed as a penguin drives this specially-built car. It was constructed by National Battery Co. and is powered by a new glass-clad Kathanode battery

Marc Catton, billiard star, tries his skill on the floor of a 1937 Hudson to demonstrate that the Hudson and Terraplane floors are as level as a billiard table





A COUPLE of "butterflies" are intrigued by Pontiac's butterfly hood and the Pontiac straight eight engine beneath it

## Service Show Planned For Philly, Mar. 2-5

Independent repairmen and their mechanics are invited to the Seventh Annual Automotive Maintenance Demonstration of Philadelphia, under the sponsorship of nine automotive jobbers in the Philadelphia area. The clinic will be held at the Terminal Commerce Building, 401 N. Broad Street, Philadelphia, March 2-5. The Demonstration will open at 2.00 P. M. and close at 11.00 P. M.

Over 100 manufacturers of automotive equipment, tools, parts and maintenance supplies will exhibit. Factory trained engineers and salesmen will be in attendance to explain all the new devices and methods that have been developed to improve and maintain the millions of motor vehicles in a safe and perfect mechanical condition.

This show is under the direction of George Henderson, Auto Gear and Parts Co., Philadelphia, Don Harris, Philadelphia Motor Accessories Co., Philadelphia and Elwood Heimbach, Heimbach Auto Supply Co., Camden, N. J. Charles H. Bauer, whose offices are located at 2453 Frankford Ave., Philadelphia, is the Show Manager.

## Chicago's Motor Salon To Be Held Feb. 13-21

The 14th annual Chicago Motor Salon, originally slated to begin Jan. 30, will be held Feb. 13 to 21 inclusive. Coming at approximately the same time as the old shows in the Coliseum, the Edgewater's Motor Salon has become increasingly important in recent years. In keeping with the current boom of the automobile industry, this year's North Side exhibition, like the show at International Amphitheater on the South Side last November, is expected to achieve new attendance and actual sales records.



TIRE-CHANGING on airplanes is just as much a headache as it is on automobiles. The device (upper right) was invented by mechanics of United Air Lines at Seattle to make changes quicker and easier

The British-built Rytecraft Scoota car (center) which has a one-cylinder 2½ hp. air-cooled engine

## To Appoint Dealers Here For British Midget Cars

A British-built midget automobile, the Rytecraft Scoota Car, is about to invade the U. S. market, according to its manufacturers, the British Motor Boat Mfg. Co., of London. The tiny cars have enjoyed increasing popularity in the British Empire and it is believed a market exists for them in other parts of the world.

Good performance is claimed for the cars, although their overall dimensions are only 8 ft. by 3 ft. 6 in., and power is furnished by a single-cylinder air-cooled engine of 250 cc. (15.25 cu. in.) capacity, rated at 2½ hp. A speed of 45 m.p.h. is claimed with excellent acceleration, and the gasoline consumption is naturally very low, an average of 80 miles per gal. being normal, according to the makers.

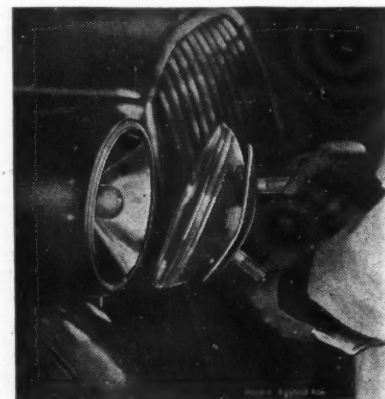
The engine and transmission form a unit with the rear wheels and are carried on a sub-frame bolted to the chassis in such a manner that anyone can easily remove them in a few minutes. Steering is positive and light. Parts requiring lubrication have been reduced to a minimum. Engine lubrication is automatic, the oil being mixed with the fuel before it is poured into the the reservoir. The engine is air-cooled, natural draft being supplemented by two fans.

A kick starter is used and an automatic decompressor assists in starting. There are three forward speeds and one reverse. The Scoota car is equipped with electric lighting and front and rear bumpers. Price of

the car in Great Britain is £80 (\$400) with full equipment. Parking and garaging are no problem with such a small car—"put away end up, it takes very little space," say the manufacturers.

## Removes Doorless Type Headlamp Lens

The Miller Tool & Mfg. Co., 1725 Sixteenth Street, Detroit, Mich., has announced a special tool for removing headlamps lens from the doorless type



headlamp. It consists of a metal shield with handles, and four live rubber vacuum cups to grip the curved surface of the lens. Eliminates danger of breaking lens, and protects mechanic's hands. List price \$2.



## Philco Radio Service Contracts Being Renewed

With the close of 1936, Philco's Warranty Labor Service plan for custom-built auto radios enters upon its second year.

Renewals of those contracts with the approximately 1500 service stations throughout the country who were enlisted during the past year are now being written, according to Robert Long, Jr., service manager of the Transitone Automobile Radio Corporation, Philco's auto radio division.

Under the Warranty plan, the stations service custom-built receivers free during the 90-day guarantee period and send weekly bills for such charges to the local Philco Auto Radio Warranty Labor Service Distributor. Checks reimbursing the service stations are sent direct by the Transitone Corporation. The set owner pays for service only after the expiration of the 90-day guarantee on his receiver.

Responses from the field indicate that a number of stations were able to build up profitable service departments during the short time the plan has been in force, especially in dense population areas, Mr. Long said.

"The profit possibilities are excellent," he said. "And those possibilities should increase. There are today about 5,000,000 radio-equipped automobiles on the roads and the number is increasing at almost an explosive rate."

## Motor Fatalities Lower in 1936

A total of 9599 automobile fatalities occurred during 1936 in 131 major cities, according to the report of the Bureau of the Census. The 1936 toll was 178 fewer than the 9777 reported in 1935. During the first half of 1936 fatalities were notably below the previous year, but in the late months of the year accidents increased sharply and were above 1935. Deaths reported in 129 cities during the last week of the year totaled 313, a rise of 107 over the last week in 1935.



International News Photo

**G. W. MASON (left), president, and C. W. Nash, chairman of the board, Nash-Kelvinator Corp.**



**FIRST FORD** Henry Ford at the tiller of the first Ford car, a two-cylinder, four cycle gasoline car, which he constructed in the spring of 1893. It had a speed of 25 m.p.h. and marked the beginning of a long and successful line of Ford cars, the 25,000,000th of which came off the assembly line last month.

## One to Twenty-five Million—

Thirty-three and a half years ago, a man worked in comparative obscurity on what was to be one of the outstanding successes, in an industry crowded with success! The man was Henry Ford and his untiring effort centered in the creation of the first Ford car. The experimental car begun by Mr. Ford in 1893 was completed in 1896.

Last month, Jan. 18, Henry Ford, with his son Edsel who is president of the Ford Motor Co. watched the 25,000,000th Ford car proceed along the assembly line at the Rouge Plant in Dearborn, Mich.

Completion of the 25,000,000th Ford—a de luxe Fordor Touring Sedan, represented the manufacture of more motor vehicles than are registered for operation today all over the United States.

The 25,000,000th car was placed on exhibition in the Ford Rotunda as the central feature in a display of the sequence of Ford models, which included all the important alphabetical models from the first Model A built by Ford in 1903, the seven others which followed, the various Model T's and Model A's and the V-8 models.

In 1903, its first year, the Ford Company produced 1708 cars, the first Model A's and C's. The next year production was only 1695, the following year 1599. Production expanded substantially in 1906, 8729 Model K, N, R and S cars being built that year, and 14,887 the following year. Up until 1908, only 28,618 cars were produced.

It was in 1908 that Mr. Ford introduced the Model T. By 1913 production had reached 181,795, in 1915 volume had passed the half-million

mark and in 1920 the total passed the million mark with a volume of 1,074,336.

The peak year for Model T was 1923 when 2,090,240 cars were produced. The next two years the total clung close to the 2,000,000 mark and then began to drop. In 1926 the volume was down to 1,665,076.

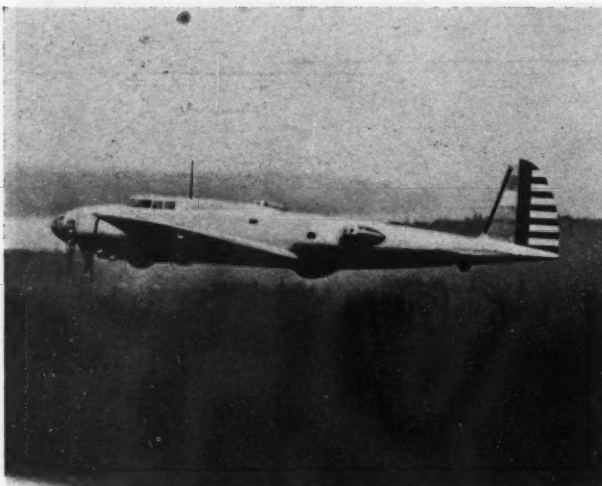
On May 4, 1924 the 10,000,000th Model T was produced. Three years later, the 15,000,000th Model T came off the line on May 26, 1927. It was almost the last of the famous cars which had made world history, for shortly afterward production was abandoned while Mr. Ford labored to create a new car.

The new product was introduced to the public Dec. 2, 1927.

The following year production was 818,734 and reached a peak in 1929 with a total of 1,951,092. The following year the effects of the depression began to be felt. Production fell to 1,485,602, in 1931 to 762,058.

Mr. Ford was then working on a new car, the V-8. It was shown to the public for the first time, March 31, 1932, when American business was sinking to the lowest reaches of the depression. Along with it was a companion car, the Model B, a refinement of the famous Model A. That year production totaled almost a half-million cars. The next year production reached 858,534 and it became apparent that the four-cylinder car was soon to pass out of the production picture.

In 1935, Ford again enjoyed a "million-car" year, the tenth since the popularity of the Model T first boosted production past the million-mark in 1920. Volume reached a total of 1,342,346 in 1935, and 1,194,800 in 1936.



**BOMBER** The first of the new Boeing YB-17 four-engined bombers, said to be the world's fastest, was flown from Seattle last month by Army Air Corps officers, bound for Wright Field, Dayton, Ohio



**TRADE-IN** A new style was set in automobile sales recently when W. G. Putnam of Spokane, Wash., bought his new Chevrolet and traded in an OX-5 Eaglerock biplane. Appleway Motors, of Dishman, Wash., took the plane in place of the usual used car

### Free Sleet-Masters In Flood Distress

At the height of the Ohio Valley flood stage, The Anderson Company, Gary, Ind., acted promptly to combat the torrents of rain and sleet which so seriously hampered the movement of cars and trucks in emergency relief work, by notifying all dealers in the flood area, over the radio, to supply Anderson wiper arms, blades, and Sleet-Masters to Red Cross officials, without charge.

In telegrams from John W. Anderson, president of the company, important radio stations in the flood zone were authorized to make the following announcement, which was broadcast at repeated intervals during the direction of rescue operations:

"Red Cross officers please note that all automotive wholesalers and retailers in Ohio Valley flood area are hereby authorized, during entire flood emergency, to deliver from their stocks, without charge, to any accredited receipting officer of American Red Cross, for needed replacements on emergency automobiles, trucks, and boats, any desired Anderson windshield wiper equipment, including Anderson blades, arms, and Sleet-Masters. Retailers please take dated receipt signed by Red Cross officer, and specifying replacements so requisitioned and delivered them. Mail such receipts to The Anderson Company, Gary, Ind., and replacements will be made at once to your stock from our factory, prepaid and no charge."

### Get This Business Booster

The Packard Electric Corp., Warren, Ohio, has developed a Business Booster Package of selling helps for garages and service stations. It is supplied free with orders for Packard cable amounting to \$10 or more. The Package includes an electric sign, 8 x 16 in., service caps, wall poster, steering wheel cards, a transfer sign for door or window, and a quantity of direct mail pieces. A special feature is a large banner and six round gummed stick-on window pieces, each presenting a cartoon with a sales message.

### Part of 1937 Car 300 to 700 Years Old

At least one part of the new 1937 car is from 300 to 700 years old. As strange as that may seem, it is true according to Electric Auto-Lite Co.—if the car is equipped with a storage battery made by the USL Division of the company. It takes Mother Nature that long to develop Port Orford cedar trees to the point where they are suitable for manufacture into separators for USL batteries.

### EasyOn Tire Chain

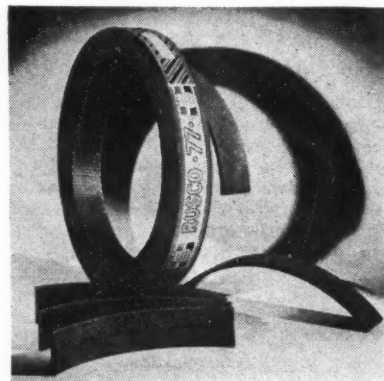
Woodworth Specialties Co., 121 Montgomery St., Binghamton, N. Y., has announced the EasyOn Tire Chain, the cross links of which are spaced a little farther apart than on the old type chains, which makes it possible to install the chain in less than one minute without jacking up the wheel, according to the manufacturer. A set of rubber tighteners is furnished with each pair of chains. Prices range from \$4.00 to \$7.25 per pair, according to size required.



"Somebody sure gave you a nasty smack in the rear."

### New Rusco Lining

The Russell Mfg. Co., Middletown, Conn., has announced their new No. 77 high friction flexible compressed wire back lining for use on internal brakes. Due to its special construc-



tion it is said to give long uniform wear and not to be materially affected by heat, grease, oil or water. When used in conjunction with Rusco 77-A low friction lining it is said to provide a truly engineered set of brakes.

### Hypoid Lubricant Dispensers Announced By Huffman

The Huffman Mfg. Co., Davis & Gilbert Aves., Dayton, Ohio, has announced two new dispensers for canned Hypoid Gear Lubricant. The



pressure lubricator fits one, two, three or ten pound cans, and is equipped with a knife which cuts a circular opening in the top of the can when it is installed in the lubricator. The lubricant is dispensed under pressure supplied by pumping the knurled cylinder. The gravity type of dispenser is furnished in two sizes, one to accommodate the one-pound can, and the other to accommodate the one, two or three pound cans.



# ROARING

## Gable Won't

Clark Gable, movie star, was reported last month contemplating entering speed trials with his Duesenberg on Muroc Dry Lake. An attack of "flu," which delayed a great deal of his screen work, has caused the actor to postpone his attempt at speed records for the time being.

## Racing Season to Open

April 25 at Reading, Pa.

The automobile racing season in the East will open at Reading (Pa.) Fair Grounds on April 25, according to the schedule now under consideration at national headquarters of the Contest Board of the American Automobile Association in Washington, D. C.

The schedule now taking shape lists the annual 500-Mile International Sweepstakes at Indianapolis on Decoration Day, Monday, May 31 this year, and two classics at the new Roosevelt Raceway as definite for the National Championship schedule. It is possible that the proposed Los Angeles (Calif.) Raceway will hold its delayed inaugural sometime in the fall, probably Oct. 28, according to Allen who offers the assurance that other title events will be included.

Aside from Indianapolis and Roosevelt Raceway, the other dates listed in the calendar below are under the promotion of Ralph Hankinson, veteran race operator. Other promoters have submitted tentative plans to the AAA Contest Board.

It is revealed in the schedule release that dates at the Roosevelt Raceway have been shifted. The George Vanderbilt Cup classic, originally carded for Labor Day has been moved up to July 5 and the Pan American Sweepstakes will be run on Sept. 6.

Following is the pre-season schedule as it now stands at AAA headquarters and to which many other events will be added:

April 25—Reading, Pa., Fair Grounds.  
May 16—Langhorne, Pa., Speedway.  
May 30—500-Mile International Sweepstakes, Indianapolis Speedway.  
June 13—Langhorne, Pa., Speedway.  
July 5—George Vanderbilt Cup race, Roosevelt Raceway, Westbury, Long Island.  
July 31—Delaware State Fair, Harrington.  
Aug. 7—Lewistown, Pa., Fair.  
Aug. 13—Altamont, N. Y., Fair.  
Aug. 14—Altamont, N. Y., Fair.  
Aug. 21—Middletown, N. Y., Fair.  
Aug. 21—Illinois State Fair, Springfield.  
Sept. 4—Flemington, N. J., Fair.  
Sept. 6—Flemington, N. J., Fair.  
Sept. 6—Pan American Sweepstakes, Roosevelt Raceway, Westbury, Long Island.  
Sept. 18 or 19—Reading, Pa., Fair.  
Sept. 25—Allentown, Pa., Fair.  
Oct. 2—Virginia State Fair, Richmond.  
Oct. 2—Trenton, N. J., Fair.  
Oct. 9—Shelby, N. C., Fair.  
Oct. 16—North Carolina State Fair, Raleigh.  
Oct. 16—Spartansburg, S. C., Fair.



# ROAD

## Rose Nosed Out; Point System Changed

An appeal against the decision of Stewards at the George Vanderbilt Cup race at the new Roosevelt Raceway last Oct. 12 recently earned for Bill Cummings the honor as first American to finish in the inaugural Vanderbilt classic.

In behalf of Cummings, who originally was listed as eighth in the official finish lineup, "Cotton" Henning, team manager, asked that the results

be revised with Cummings in seventh place. He insisted that Mauri Rose, rated seventh in the finish order, had not spent the full minute in the pits as required for the compulsory pit stop which governed the Vanderbilt Cup race.

Study of reports of the Technical Committee at Roosevelt Raceway showed that Rose had stopped in the pits only 48 seconds during the compulsory halt and he was docked the other 12 seconds necessary to make up the full minute required by the rules. Since Rose was originally credited with a margin of only 7.84 seconds ahead of Cummings in the finish order, the 12-second penalty then placed him 4.16 seconds back of Cummings in the revision.

Although Rose goes back to eighth place by reason of the Contest Board's decision and despite a change in the National Championship point rating also ordered at the annual meeting, Rose retains the Championship crown 10 points ahead of Lou Meyer, this year's Indianapolis winner for the third time.

The Board reversed action of a special committee which had changed the point system in mid-season. It was ruled that the Committee "was without authority to effect the change-over in midseason" and a revision of the standing was ordered based on the point-per-mile scale annually in effect since 1930. The new scale, a sliding chart providing for the length of the race and known as the Grand Prix point system, likely would be in effect during the 1937 season at title events, it was said at Contest Board (Continued on page 65)



Bill Cummings

Declared first American to finish in last year's Vanderbilt Cup classic.



**REX AND CHET, MOVIE STARS** Top-flight stars of the Roaring Road. Rex Mays and Chet Gardner have turned their speedsters towards Hollywood. Here are Rex and Chet posed with Patricia Farr and Dorothy Wilson in the racing film being made at Columbia Studios. The picture is called "Racing Luck" and will be released just about the time that the bomb bursts next May at Indianapolis

### Three Americans to Race In Italian Grand Prix

Records of America's leading speed kings were being studied by the Contest Board of the American Automobile Association, as MOTOR AGE went to press, with a view to select the three most representative drivers to complete in the Grand Prix of Tripoli in Libya, Northern Africa, on May 9.

From the many applicants for the assignment, the trio best equipped to cope with the difficult 8.1-mile course, will be selected to fly the stars and stripes. The United States has not been represented in the important Tripoli classic since Pete DePaolo and Lou Moore "went over" in 1934. They were up with the leaders in the early stages of the event but their gear-shifting and braking equipment proved to be inadequate.

Characteristic of road racing conditions throughout Europe, the Tripoli race carries a heavy demand for cars equipped with transmissions

easily shifted but still strong enough to withstand the constant changes. Speed is also an important requisite for the lap record now stands at slightly better than 140 miles per hour and the average for the 300-mile event last year was 129.61 miles per hour, turned in by Varzi who won with an Auto-Union. In 1935, Caracciola won with a Mercedes at 123.02 miles per hour, and in 1934 Varzi won with an Alfa at 115.67 miles per hour.

The three Americans to be selected for the Tripoli race will be scheduled on the trip to provide for their return to the United States in time to compete in the "500" at Indianapolis on Decoration Day.

#### Cagney Cup

James Cagney, motion picture hero, has presented a cup for the champion among midget racers in a series of contests running weekly at Boston, Mass.

### Sectional Titles Ended

Hoping to avoid confusion and to strengthen the National Championship, the Contest Board of the American Automobile Association has decided to eliminate the sectional Championships for which the auto racing drivers have annually battled in various districts for several years. The decision was reached at the governing Board's annual meeting in New York City on Jan. 17 and 18.

As a result of this ruling there will be no title recognition in the Eastern States, Southeastern States, Midwestern States, and the Pacific Coast during 1937. The Pacific Coast title was created five years ago and is currently held by Rex Mays; the Eastern States title, created in 1933, is held by Frank Bailey; the Southeastern States title-circuit, created in the campaign recently closed, is led by Rob Sall, Eastern Champ in 1933, and the Midwestern title belongs to Rex Mays and had its beginning three years ago.

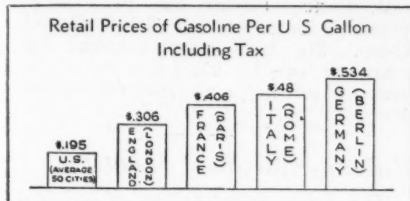


**33 YEARS AT DATONA** These contrasting pictures, taken at Daytona Beach, show what progress the cars of today represent. (On the right) A picture taken in 1904 when 22 cars lined up for the first International Speed Trials, the main event of which was won by William K. Vanderbilt



## Gas Costs Less Here

Comparison of gasoline prices here and abroad, including tax, shows how great is the advantage enjoyed by the American motorist. Low gasoline prices, says W. M. Irish, president,



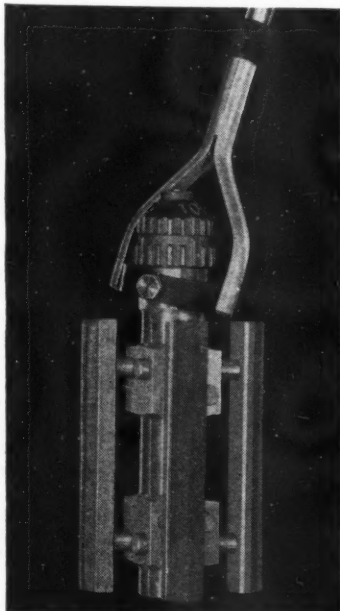
The Atlantic Refining Company, while not so generally given the credit, explain almost as much as low automobile prices, why there is an automobile for every 4.8 persons in this country, while in Europe there is only one car for every 76.4 persons.

Taking the average of fifty representative cities in the United States, state and federal sales taxes on gasoline have risen from 2.41 cents per gallon in 1926 to 5.34 cents at the present time, but the service station price, including tax, is 19.51 cents—about four cents less than it was in 1926. Based on the latest figures released by the U. S. Bureau of Mines, the retail price per gallon, including tax, is 30.6 cents in London; 40.6 cents in Paris; 48 cents in Rome; 53.4 cents in Berlin.

Figures released by the U. S. Bureau of Labor Statistics show that the price of gasoline and other petroleum products lags far behind in the general rise in prices that has occurred, particularly during the past year.

## Hone Has New Features

A new cylinder hone having several new features has been introduced by the Lisle Corp., 813 East Main St., Clarinda, Iowa. Known as the Lisle Long-Stone. Cylinder Hone, it is



equipped with stones that are 5 in. long to insure true alignment, a screw-spiral expansion to hold the stones in positive adjustment, and a micrometer adjustment with large,



clear graduations which are easily visible from a standing position above the motor. The hone has an expansion range from 2 11/16 in. to 4 1/2 in. Free literature and shop pictures of the hone in service may be had by writing the manufacturer. The hone is sold on a 30-day trial basis with a money-back guarantee.

## "Philco and I, Cheerio"

### For Another Year

Boake Carter starts his fifth consecutive year as CBS news commentator under the sponsorship of the Philco Radio & Television Corporation on February 22. Carter's daily broadcasts for Philco have been heard since January, 1933, and have continued throughout the year every year since then.

## Free Wall Display

Continental Rubber Works, 1902 Liberty St., Erie, Pa., has introduced a new Wall Display which they are offering free to dealers of Vitalic Fan Belts and Radiator Hose. It is made of heavy gage metal, 36 in. long and 4 1/2 in. wide, and is equipped with eight hooks to provide a means of displaying fan belts and radiator hose. The color scheme is Vitalic Orange background with black lettering and white outlining.

## Bendix Radio Formed

Bendix Aviation Corp., through its president, Vincent Bendix, has announced the organization of the Bendix Radio Corp., a new concern which will take over four companies now operating in the aircraft radio field. The consolidated concern, Mr. Bendix said, will be the largest of its kind in the world.

The companies involved in the consolidation are named as: The Radio Research Co., of Washington, D. C.; Radio Products Co., of Dayton, Ohio; and the William P. Hillyard Co. and Jenkins & Adair, Inc., of Chicago.

The new company, according to the announcement made by Mr. Bendix, will specialize in directional radio compasses for private and transport planes. It will be wholly owned by Bendix Aviation Corp., and Mr. Bendix will serve as its president.

The company will also manufacture a large number of communication accessories.

## Important Information Free

The use of colloidal graphite for upper cylinder lubrication and for crankcase lubrication is explained in a booklet recently issued by Acheson Colloids Corp., Port Huron, Mich.



**OBJECTIVES OPENLY PROCLAIMED** Union leaders prepare to head a parade of strikers in Detroit. Left to right: Richard Frankenstein, United Automobile Workers organizer; Julius Hochman, president of the Garment Workers Union; Homer Martin, UAW president; and Walter Reuther, organizer for the Committee on Industrial Organization.

## ***Repairman's Visit To The***

# **FACTORIES**

Designs for a modern office building at Racine, Wis., for S. C. Johnson & Son, Inc., makers of Johnson's Wax Polishes, have been completed by Frank Lloyd Wright, architect. The new building will be ready for occupancy this summer.

\* \* \*

K. S. Clapp has been promoted to the position of General Manager of The U. S. Air Compressor Co. of Cleveland, Ohio. Mr. Clapp served as Sales Manager and Director of Sales for the past twelve years.

The Company has also announced the appointment of F. C. Reynolds as manager of Oil Company Sales and S. V. Shipman as Manager of Automotive Jobber Sales.

\* \* \*

R. E. Olds has resigned as chairman of the board of directors of the Reo Motor Car Co. A pioneer of the automobile industry more than 40 years ago, Mr. Olds now wishes to be "free to enjoy vacations unhampered by responsibility." He plans an extended trip to California and Australia.

\* \* \*

Doyle Johnson, of Detroit, now represents the Borg-Warner Service Parts Company in eastern Canada, according to an announcement by W. E. Salter, sales manager.

Selby F. Greer, of Portland, Oregon, now represents the Borg-Warner

Service Parts Company in British Columbia, Alberta and Saskatchewan, in addition to his territory of Washington, Oregon, Idaho, Utah and Montana. Ward Hunter, of Minneapolis, travels Manitoba for Borg-Warner in addition to Minnesota, North Dakota, South Dakota and western Iowa.

\* \* \*

Harold Van Doren, industrial designer, has been retained by The Aro Equipment Corporation of Defiance, Ohio. Mr. Van Doren will apply his experience in practical machine design to the Aro line of filling and service station equipment, redesigning several items and acting as consultant to their engineers.

\* \* \*

Rogers Products Co., Inc., of Jersey City, N. J., manufacturers of Ever-ready Lubrication Equipment, announced an increase of 10 per cent in the hourly wage rate of all employees, regardless of the length of time they have been in the employ of the company, effective last month.

\* \* \*

Officials of Sears, Roebuck & Co., Chicago mail order house, have refused to comment on current reports that it is planned for the company to reenter the farm tractor field. Asked as to reports that a contract has been made with Graham-Paige Motors

Corporation to manufacture a tractor equipped with a high compression engine the same as is used in Graham-Paige automobiles, officials of the mail order house replied merely "we would rather not discuss it at this time."

\* \* \*

J. Coard Taylor has been elected vice-president of the Ethyl Gasoline Corp. He has been general sales manager of the company since 1929 and will continue as head of the sales division.

## ***Edison-Splitdorf Meeting***

The sales organization of the Edison-Splitdorf Corp., West Orange, N. J., got together last month at the factory to hear plans for advertising and merchandising the new Edison Spark Plug with the Built-In Leak Proof Gasket.

## ***Willard Sales Caucus***

For the first time in several years the Willard Storage Battery Company called the sales organizations of the Willard Storage Battery Co. of Canada, Ltd., and the Willard Storage Battery Co. of California to join with the sales force of the parent company in a sales caucus at the main plant in Cleveland, Ohio, last month.

Because the company is making a number of important changes in the functions and responsibilities of their field men, the management brought all the field representatives of the three companies together for the entire week of Jan. 24.

## ***Borg-Warner Acquires U. S.***

### ***Pressed Steel Products Co.***

Acquisition of all assets and business of the U. S. Pressed Steel Products Co. of Kalamazoo, Mich., by the Ingersoll Steel & Disc division of Borg-Warner Corp. has been announced by Roy C. Ingersoll, president of the division and a vice-president of Borg-Warner.

## ***New Motorola Plant***

Construction has been started on the \$250,000 factory and office building at 4545 West Augusta Boulevard, Chicago, by the Galvin Mfg. Corporation, which will provide 85,000 additional square feet of floor space for the manufacture of Motorola auto and household radios.

According to Paul V. Galvin, president and treasurer, the present output of 2000 auto sets daily in the concern's factory at 847 W. Harrison Street, Chicago, will be increased to 3000 in the new plant, and the new Motorola Home Radio will be produced there.

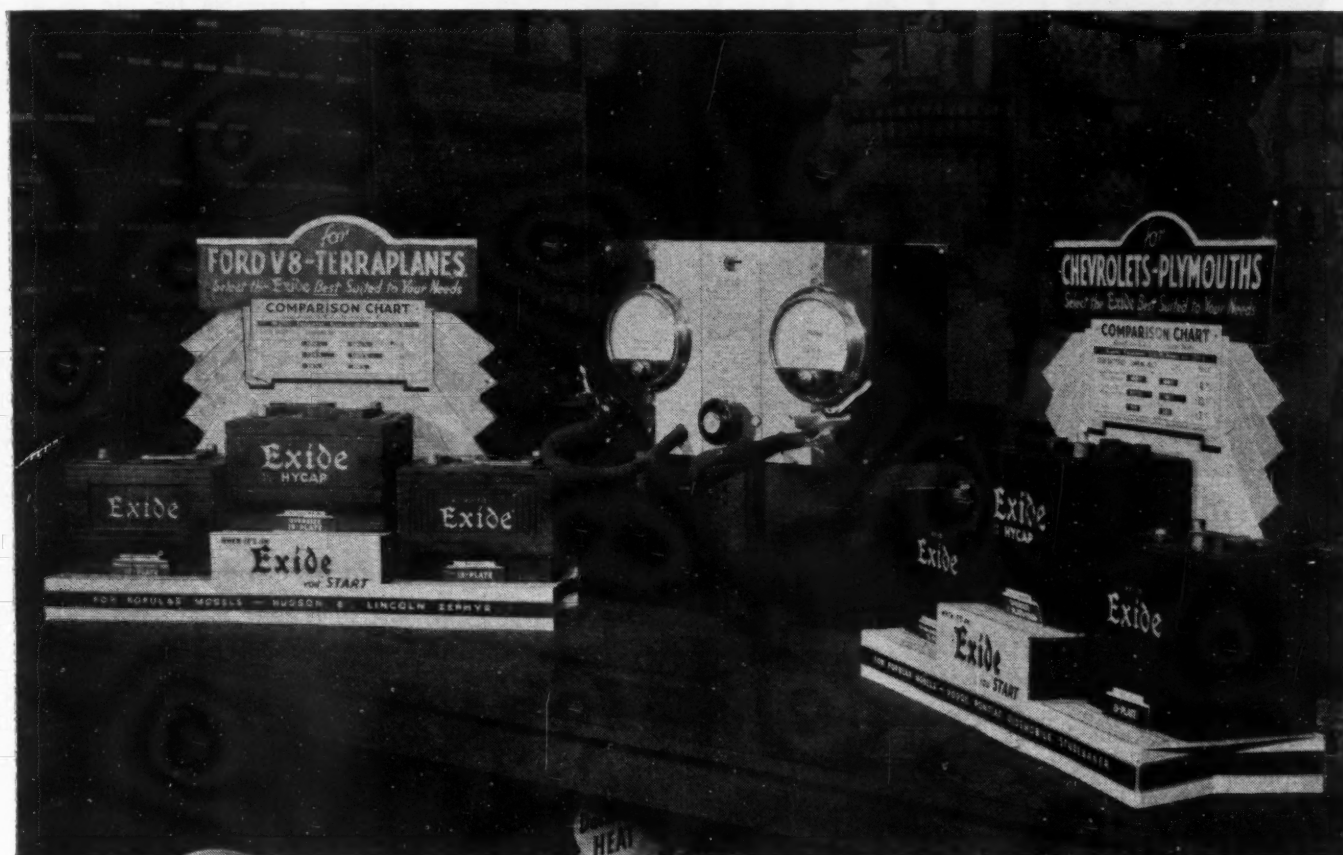
The new factory is scheduled for completion on April 1, 1937, and will be one and two stories in height with the general offices in the second story section.

Upon the completion of the new building, which is on a tract of land seven and one-half acres in area, the company will occupy over 135,000 sq. ft. of factory and laboratory space.

The new 1937 line of Motorola car radios was announced early in January, and according to Mr. P. V. Galvin, the Motorola Home Radio will be in production early in the spring of 1937.



# Why dealers like Exide



## ... Exide Merchandising simplifies the battery business

Service is easier and far more profitable, sales are easier and more certain—when you have the Exide Proposition working for you. Service becomes a real sales instrument, not only paying its way, but paying big extra dividends by building increased sales.

The entire Exide Program is coordinated, cutting out lost motion and making every phase of the battery business simple and easy. Take the Exide Automatic Vendors for instance. They attract attention, display the batteries and sell them. They do it almost automatically—and they concentrate your

sales on the higher-profit Exide Hycap types.

Behind Exide Batteries, behind the Automatic Vendors and the special Exide Sure-Start Service equipment is the consistent, powerful Exide advertising. It reaches into the homes of car-owners, telling them what you as an Exide dealer can do for them, and it brings them into your station already "sold" on Exide.

Is it any wonder dealers like Exide? For Exide has made the battery business a far more profitable business to be in. Get in touch with your Exide Wholesaler today, or write to us.



THE ELECTRIC STORAGE BATTERY CO.  
Philadelphia

*The World's Largest Manufacturers of  
Storage Batteries for Every Purpose*

Exide Batteries of Canada, Limited, Toronto



**TAILOR-MADE** A newly designed drive-on type of lift, made by U. S. Air Compressor for the low-swung modern cars. One of the features of this design is that there are no obstructions on either end of the runways, so that practically all lubrication points are accessible

### U. S. Air Compressor Makes "Tailor Made" Drive-on Lift

The present design of automobiles, with their low running boards, skirt-type fenders and increased number of lubrication points, has had its effect upon the design of lubricating hoists.

The United States Air Compressor Company of Cleveland, Ohio, has recently developed a new "Tailor Made" drive-on type of lift. The cross head is only 18 in. wide, and is located directly over the single piston. This cross head is constructed of  $\frac{1}{2}$  in. pressed steel and reinforced with heavy box type web sections so as to eliminate all spring or twist when off-center loads are placed on the runways.

There is no obstruction on either end of the runways, as all tie rods have been eliminated so that the front and rear of the car, where 90 to 95 per cent of the lubrication points are to be found on an automobile, are absolutely free and accessible.

On each end of the extra wide runways a large approach ramp has been designed to make it easier to drive on and off the lift, and wide steel rollers underneath the ramps prevent them from cutting or marring the floors when the lift is lowered. Automatic and positive wheel blocking locks are incorporated in the ramps, and provide a full 15 ft. space for the car on the runway. These locks eliminate the necessity of spotting support blocks.

The runways are designed to accommodate delivery trucks equipped with dual tires, and are spaced "three man wide," as shown in the accompanying illustration.

### New Sales Manual

The Hoof Products Co., Chicago, Ill., has just announced a new sales information manual containing data on all matters relating to the use of governors. A copy will be sent free upon request.

### Woods Are Full of Them

Between 40,000 and 50,000 trailer coaches are now being used as permanent homes, said George Terbough, of the Federal Reserve Bank board, speaking before the American Economic Association in Chicago last week, adding that they are helping to solve the nation's housing problem. Total number of trailers used as full or part time residences is about 300,000, Mr. Terbough estimates.

## Gilmore-Yosemite Economy Run

### Remarkable Economy Records Made by Participants;

### Grahams Take 1st and 2nd, Hudson 3rd Place

Relative standing of the cars which participated in the Gilmore-Los Angeles-Yosemite Economy Run, held Jan. 7, 1937, under the supervision of the Contest Board of the American

Automobile Association, has been announced. The following table, furnished by the Hudson Motor Car Co., gives details of the results achieved by the 23 cars which took part.

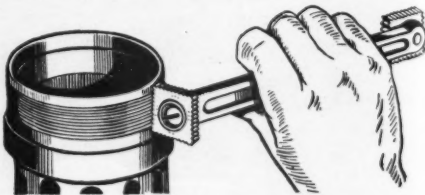
Relative Standing in Gilmore-Yosemite Economy Run, Los Angeles to Yosemite Valley, Jan. 7, 1937. 352 mi. supervised by American Automobile Association.

Class	Make	Cyl.	Mi. Per Gal.	Ton Mi.	Mi. Per Hr.	Place	Sweep
A	Willys	4	27.29	46.4	32.10	2	
A	Willys	4	28.16	49.2	31.81	1	
B	Plymouth	6	20.83	41.5	33.79	2	
B	Chev.-Master	6	19.45	41.8	33.90	1	
C	Terraplane	6	22.00	48.4	33.57	1	
C	Pontiac	6	21.60	47.5	31.15	2	
C	Nash-Lafayette	6	20.47	44.8	33.63	4	
C	DeSoto	6	20.23	45.5	34.57	3	
D	Oldsmobile	6	18.53	40.2	34.17	3	
D	Graham-Cavalier	6	24.62	52.246	32.69	1	2nd
D	Pontiac	8	18.33	41.3	31.62	2	
E	Graham 116 Super	6	23.95	53.4	31.90	1	1st
E	Hudson	8	22.71	52.232	32.64	2	3rd
E	Chrysler-Royal	6	22.14	49.59	33.52	3	
E	Nash-Ambass.	6	21.60	47.3	31.11	4	
E	Packard	6	19.89	44.5	31.15	5	
E	Oldsmobile	8	17.17	41.0	34.17	6	
F	Nash-Ambass.	8	20.35	49.6	32.10	1	
F	Chrysler-Imp.	8	19.45	47.6	34.46	2	
F	Lincoln-Zephyr	12	18.05	41.7	34.29	3	
G	Packard-120	8	18.05	43.6	31.52	1	
H	Cord	8	18.24	45.6	34.80	1	
H	Chrysler-Airflo	8	15.64	43.6	30.34	2	

Note: No oil was consumed by any of the entries. Willys No. 1 car used 2 pt. of water; De Soto 6 No. 3 car used  $2\frac{1}{2}$  pt. of water. Pontiac 8 took on full tank of water.

### oTc Universal Thread Chaser

The oTc Universal Thread Chaser, a product of Owatonna Tool Co., Owatonna, Minn., is built particularly to clean up damaged or crossed threads on large diameters. It is particularly adaptable for use on axle housings on trucks with full floating



axle, for differential housings, bearing cages, bearing carriers, etc. This Chaser can be used on inside and outside threads, left hand or right hand threads on any diameter. Each die head carries four different thread pitches, making eight in all. Die heads are interchangeable to any position on either end of the handle. Price \$3.50.

### Open West Coast Branch

C. E. Niehoff & Co., Chicago, has announced the opening of a Pacific Branch in Los Angeles with offices, showroom, and stockroom at 1340-42 South Flower Street, from which point Coast jobbers now may be served directly.

With these new facilities the entire line of Niehoff Electrical Parts and Equipment is displayed for the convenience of jobbers and their customers.

Operations are under the direct supervision of Paul G. Niehoff, western representative, with Ted Maschek acting as assistant.



# 3 ways you profit, handling THE WORLD'S NUMBER ONE CARBURETOR

Besides the prestige and good will which go with sales representation of Stromberg—used on more makes of cars than all other carburetors combined—consider these three profit avenues:

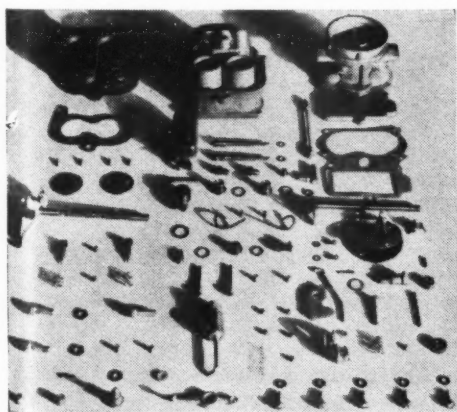


1. **REPLACEMENT CARBURETORS!** Owners of older cars and trucks, at overhaul-time, are readily willing to re-carburetor for the sake of modernized performance of Stromberg carburetion.
2. **REPLACEMENT PARTS!** All mechanisms wear out . . . even carburetor parts. There's a steady demand for genuine Stromberg factory renewal parts. Stromberg standardization makes heavy inventory unnecessary. A compact cabinet kit serves all normal needs.
3. **STROMBERG EXCHANGE PLAN!** Exclusive, practical, profitable for everybody! Turn in the old, worn Stromberg in exchange for a factory-remanufactured duplicate unit at moderate cost. No delay—no fussing.

There's the three-way profit program which has put up the famous sign of Stromberg Service over thousands of progressive shops the country over. The investment needed is very, very small. The benefits are very, very sure. The added overhead is almost nothing at all.

Write a note and ask about it today! Address—

**BENDIX PRODUCTS CORPORATION**  
(Subsidiary of Bendix Aviation Corporation)  
401 Bendix Drive South Bend, Indiana



*These parts are required to make a new Stromberg EE-1 Carburetor. Forty-six of them are replaced with brand new parts when this carburetor is re-manufactured at the factory.*

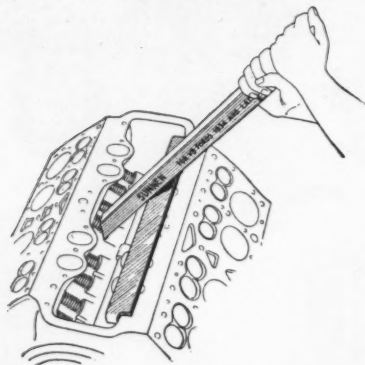
# STROMBERG

*Pioneer of Carburetion Advancement*

## Sunnen Valve Lifter

### Protector Plate

A protector plate designed to fit on the inner edge of the block to protect the manifold ports and the sharp edge of the block while remov-

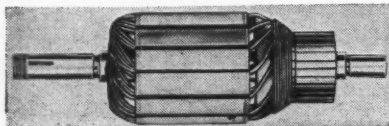


ing carbon stuck valve assemblies from the Ford V-8 motor, has been announced by Sunnen Products Co., St. Louis, Mo. The protector plate and valve lifter will be sold as a combination for a net price of \$2.70.

## Weatherhead Announces

### Line of New Armatures

A complete line of replacement armatures for all makes of cars and trucks has been announced by the Weatherhead Co., 708 Frankfort Avenue, N. W., Cleveland, Ohio. Of par-

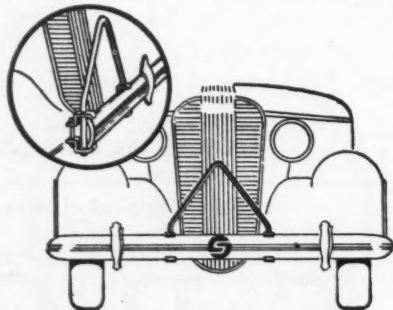


ticular interest to the automotive electrical trade is that all numbers, not only for current model cars and trucks but also for obsolete models as well, are available. All of these armatures meet the specifications of original equipment, and immediate shipment will be made from the Weatherhead factory warehouse.

## Center Guard Protects

### Radiator Grille

Snyder, Inc., 813 Noble St., Philadelphia, Pa., has developed a new type of center guard to protect the radiator grille. It consists of a 3/4 in. solid



steel alloy bar, chromium plated, and attaches to the center of the front bumper by clamps located on the back of the bumper bar. List price \$1.85.

## \$15,000 for a Used Car

Fifteen thousand dollars is probably a record price to pay for a 12-year-old automobile. But Prince Chula of Siam, a resident of London, has just paid that much cash for the Delage racer of 91½ cu. in. displacement designed in 1923 and raced for the first time in 1924. During the past season the car was driven by Richard Seaman and won practically every event in which it was entered. Engineer Lory was responsible for the design of the car. While it has been kept in good condition it has not been modified in any way since it was built. Delage is reported to have recently refused an offer of \$35,000 to build a duplicate.

## International Piston Ring

### Improvements Announced

The International Piston Ring Co., 2401 West Superior Ave., Cleveland,

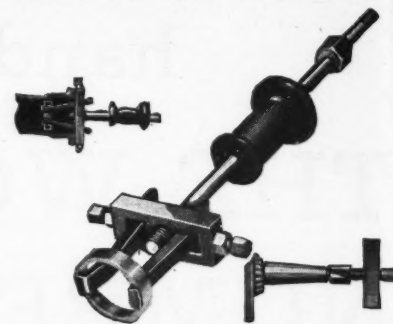


Ohio, has announced improvements in their scraper type compression ring and in the spring type compression Chief, which are expected to result in greatly improved performance.

## Three-In-One Puller

### Does Quick Job

National Machine & Tool Co., 801 So. Water St., Jackson, Mich., has developed a new puller that performs



three jobs. It will remove rear axle shafts, Timken bearing races and grease retainers. Puller fingers are made of heavy drop forged steel 1 in. wide at the end of the jaw, giving a firm grip on the bearing race or retainer. Catalog number 500, list price \$8.50.

## Lathe Catalog Available

The South Bend Lathe Works, 425 East Madison Street, South Bend, Ind., has just published their Catalog No. 15-K, describing the 1937 model 9-in. Workshop Lathe, which is being supplied in seven different styles.



"I dunno Ma—he was under there when we left Albuquerque"





## A TRADEMARK KNOWN AROUND THE WORLD

As the originator and pioneer in the manufacture and application of colloidal graphite to industry, this Company is extremely proud of its advance during the twenty-eight years of its existence.

Coupled with the natural versatility of "dag" colloidal graphite, continuous research has spread this trademark around the World. It may be encountered functioning as a lubricant in many types of machinery; in electronics, on television tubes; or even as a background for the photographing of mosquitoes' windpipes for medical research.

"Dag" colloidal graphite, made from electric-furnace graphite, is of the highest degree of purity. The Acheson Process of colloidalization assures graphite of the finest particle size available. Send for the interesting and informative "cigarette paper test" pamphlet.

*Ask your oil supplier about his colloidal-graphited lubricants today*

ACHESON COLLOIDS CORPORATION ♦ PORT HURON, MICHIGAN



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# COLLOIDAL GRAPHITE

"DAG" COLLOIDAL GRAPHITE IS A 100% AMERICAN MADE MATERIAL

# Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-door Sedan	Wheelbase (Ins.)	Tire Size (Ins.)	ENGINE																	CHASSIS				
					No. of Cylinders, Bore and Stroke	Taxable H.P.	Piston Displacement (Cu. Ins.)	Maximum Brake H.P. at Specified R.P.M.	Compression Ratio (to-1.)	Displacement Factor %	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Type and Make	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension
1	Auburn.....654	120	6.00/16	6-3 1/2 x 4 1/2	22.5	209.9	85-3500	6.20	41.3	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A...	USL	P.Long.	WG.	Nb-Mec.	1/2 Col.	4.44	C		
2	Auburn.....852	127	6.50/16	8-3 1/2 x 4 1/2	30.0	279.9	115-3600	6.50	41.4	Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A...	USL	P.Long.	Det.	Nb-Mec.	1/2 Col.	4.08	C		
3	Auburn.....SC852	127	7.00/16	8-3 1/2 x 4 1/2	30.0	279.9	150-4000	6.50		Al.	Whit.	Al.	Pur.	AC.	Str.	Buf.	A...	USL	P.Long.	Det.	Nb-Mec.	1/2 Col.	4.08	C		
4	Buick.....37-40	976	6.50/16	8-3 1/2 x 4 1/2	30.6	248.0	100-3200	5.70	39.2	Cl.	LB.	Ala.		AC.	SM.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2	Own	4.40	IC.	
5	Buick.....37-60	1162	7.00/15	8-3 1/2 x 4 1/2	37.8	320.2	130-3400	5.75	42.7	Cl.	LB.	Ala.		AC.	SM.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2	Own	3.90	IC.	
6	Buick.....37-80	1418	7.00/16	8-3 1/2 x 4 1/2	37.8	320.2	130-3400	5.75	39.4	Cl.	LB.	Ala.		AC.	SM.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2	Own	4.22	IC.	
7	Buick.....37-90	1966	7.50/16	8-3 1/2 x 4 1/2	37.8	320.2	130-3400	5.75	40.2	Cl.	LB.	Ala.		AC.	SM.	Wal.	D.	Del.	P.Own.	Own.	m-Spi.	1/2	Own	4.62	IC.	
8	Cadillac V8-60 & 65	124, 131	(t)	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	40.9	Cl.	Mor.	Ala.	Han.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	1/2	Own (w)	4.10	IC.	
9	Cadillac V8-70 & 75	131-38	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	41.4	Cl.	Mor.	Ala.	Han.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	1/2	Own (v)	4.10	IC.	
10	Cadillac V12-85	138	7.50/16	12-3 1/2 x 4	46.9	368.0	150-3600	6.00	40.8	Cl.	Mor.	Ala.	Han.	AC.	DL.	Own.	D.	Del.	P.Long.	Own.	Nb-Mec.	1/2	Own	4.60	IC.	
11	Cadillac V16-90	154	7.50/17	16-3x4	57.6	452.0	185-3800	6.00	40.5	Cl.	Mor.	Ala.	Han.	AC.	DL.	Own.	D.	Del.	P.Own.	Own.	Nb-Mec.	1/2	Own	4.64	IC.	
12	Chevrolet Master	112 1/2	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	35.4	Cl.	Own.	Cl.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	1/2	Own	3.73	C	
13	Chevrolet Mas.DeL.	112 1/2	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	39.0	Cl.	Own.	Cl.	No.	AC.	Car.	Own.	D.	D.	P.Own.	Own.	m-Own.	1/2	Own	4.22	IC.	
14	Chrysler Roy. C-16	910	6.25/16	6-3 1/2 x 4 1/2	27.3	228.1	93-3600	6.50	38.8	Cl.	Mor.	Ala.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B.B.	Own.	Nb-UP.	1/2	Own	4.10	IC.	
15	Chrysler Imp. C-14	1100	6.50/16	8-3 1/2 x 4 1/2	33.8	273.8	110-3600	6.70	41.7	Al.	Mor.	Ala.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B.B.	Own.	Nb-UP.	1/2	Own	4.10	IC.	
16	Chrysler Cus.Im.C-15	2060	7.50/16	8-3 1/2 x 4 1/2	33.8	323.5	130-3400	6.50		Al.	Mor.	Ala.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B.B.	Otn.	Nb-UP.	1/2	Own	4.55	IC.	
17	Chrysler Airflow C-17	1610	7.50/16	8-3 1/2 x 4 1/2	33.8	323.5	130-3400	6.50	40.3	Al.	Mor.	Ala.	Pur.	AC.	Str.	Bur.	A.	Wil.	P.B.B.	Otn.	Nb-UP.	1/2	Own	4.30	C	
18	Cord.....812	125	6.50/16	8-3 1/2 x 3 3/4	39.2	288.6	115-3600	6.30	40.3	Al.	Whit.	Al.	No.	AC.	Str.	NS.	A.	USL	P.Long.	Own.	Ben.	Tu	Own	4.70	IT.	
19	De Soto Airstream 6	870	6.00/16	6-3 1/2 x 4 1/2	27.3	228.1	93-3600	6.50	39.0	Cl.	Mor.	Ala.	Pur.	Bur.	Car.	NS.	A.	Wil.	P.B.B.		Nb-UP.	1/2	Own	4.10	IC.	
20	Dodge.....Six	820	6.00/16	6-3 1/2 x 4 1/2	25.3	217.8	87-3600	6.50	38.7	Cl.	Mor.	Ala.	Pur.	AC.	Str.	NS.	A.	Wil.	P.B.B.		Nb-UP.	1/2	Own	4.10	C	
21	Duesenberg.....J	142-153 1/2	7.00/19"	8-3 1/2 x 4 1/2	45.0	419.7	320-4200	5.20		Cl.	LB.	Al.	Pur.	Yes.	Str.		D.	Exi.	dpLong.	Own.	m-Spi.	1/2	Own		C	
22	Ford.....V8-60	112	5.50/16	8-2 1/2 x 3 1/2	21.6	136.0	60-4200	6.6	30.4	Al.	Gear.	CS.	No.	Yes.	Str.	Own.	O.	Own.	P.	Own.	m-Spi.	1/2	Own	4.44	Tr.	
23	Ford.....V8-85	112	6.00/16	8-3 1/2 x 3 3/4	30.0	221.0	85-3800	6.12	37.9	Al.	Gear.	CS.	No.	Yes.	Str.	Own.	O.	Own.	P.Os.	Own.	m-Spi.	1/2	Own	3.78	Tr.	
24	Graham.....85	770	5.25/17	6-3x4	21.6	169.6	70-3500	6.80	35.7	Al.	LB.	Ala.	No.	Bur.	Mar.	Old.	D.	Wil.	P.III.	WG.	Nb-UP.	1/2	Spi.	4.55	C	
25	Graham.....95	905	6.00/16	6-3 1/2 x 4	25.3	199.1	85-3800	6.70	37.9	Al.	LB.	Ala.	No.	Bur.	Mar.	Old.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Spi.	4.45	C	
26	Graham.....S.C. 116	1050	6.25/16	6-3 1/2 x 4	25.3	199.1	106-4000	6.70		Al.	LB.	Ala.	Fram	Bur.	Mar.	Old.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Spi.	4.27	C	
27	Graham.....S.C. 120	1160	6.50/16	6-3 1/2 x 4 1/2	25.3	217.8	116-4000	6.70		Al.	LB.	Ala.	Fram	Bur.	Mar.	Old.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Spi.	4.27	C	
28	Hudson.....6-73	122	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	36.8	Cl.	Ge.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	1/2	Own	4.11	C	
29	Hudson.....8, 74-5-6-7	122, 129	6.25/16	8-3x4 1/2	28.8	254.0	122-4200	6.25	41.2	Cl.	Ge.	Al.	No.	AC.	Car.	Old.	A.	Nat.	P.Own.	Own.	Nb-Spi.	1/2	Own	4.11	C	
30	La Salle.....V8, 37-50	124	7.00/16	8-3 1/2 x 4 1/2	36.4	322.0	125-3400	6.25	41.0	Cl.	Mor.	Ala.	Han.	AC.	Str.	Old.	D.	Del.	P.Long.	Own.	Nb-Mec.	1/2	Own	3.92	IC.	
31	Lincoln.....Zephyr	122	7.00/16	12-2 1/2 x 3 3/4	36.3	267.3	110-3900	6.7	42.6	Al.	Gear.	CS.	No.	Yes.	Str.	Own.	O.	Own.	P.Os.	Own.	m-Own.	1/2	Own	4.44	Tr.	
32	Lincoln.....V12	136-145	7.50/17	12-3 1/2 x 4 1/2	46.8	414.0	150-3400	6.38	38.9	Al.	Chn.	Ala.	Pur.	Yes.	Str.	Own.	O.	Exi.	P.Long.	Own.	m-Own.	1/2	Own	4.44	Tr.	
33	Nash.....Amb. 6, 3720	960	6.25/16	6-3 1/2 x 4 1/2	27.3	234.8	93-3400	5.67	36.2	Cl.	Whit.	Ala.	BS.	Bur.	Str.	Wal.	A.	USL	P.B.B.	Otn.	Nb-Mec.	1/2	Own	4.11	C	
34	Nash.....Amb. 8, 3780	1080	7.00/16	8-3 1/2 x 4 1/2	31.2	260.8	105-3400	5.64	35.5	Cl.	Dia.	Ala.	BS.	AC.	Str.	Wal.	A.	USL	P.B.B.	Otn.	Nb-Mec.	1/2	Own	4.10	C	
35	Nash Lafay. 400-3710	810	6.00/16	6-3 1/2 x 4 1/2	27.3	234.8	90-3400	5.61	37.4	Cl.	Whit.	Ala.		Bur.	Str.	Wal.	A.	USL	P.B.B.	Otn.	Nb-Mec.	1/2	Own	4.11	C	
36	Oldsmobile.....F37	117	6.50/16	6-3 1/2 x 4 1/2	28.4	229.7	95-3400	6.10	38.1	Cl.	Whit.	Ala.	No.	AC.	Car.	Var.	D.	D.	P.B.B.	Own.	Nb-Mec.	1/2	Own	4.37	IC.	
37	Oldsmobile.....L37	124	7.00/16	8-3 1/2 x 3 3/4	33.8	257.1	110-3600	6.20	39.1	Cl.	LB.	Ala.	No.	AC.	Car.	Var.	D.	D.	P.B.B.	Own.	Nb-Mec.	1/2	Own	4.37	IC.	
38	Packard.....115C	995	6.50/16	6-3 1/2 x 4 1/2	28.3	237.0	100-3600	6.30	39.7	Cl.	Mor.	Ala.	No.	AC.	CG.	Old.	D.	Wil.	P.	Own.	Nb-Mec.	1/2	Own	4.36	IC.	
39	Packard.....120C	1170	7.00/16	8-3 1/2 x 4 1/2	33.8	282.0	120-3800	6.50	40.7	Al.	Mor.	Ala.	No.	AC.	SC.	Old.	A.	PD.	P.	Own.	Nb-Mec.	1/2	Own	4.09	IC.	
40	Packard.....1500, 1, 2	2480	127-34-39	8-3 1/2 x 5	32.5	320.0	130-3200	6.50	41.0	Al.	Mor.	Ala.	Pur.	AC.	Str.	Old.	DA.	PD.	P.	Own.	Nb-UP.	1/2	Own	4.69	IC.	
41	Packard.....1506, 7, 8	3670	132-39-44	12-3 1/2 x 4 1/2	56.7	473.0	175-3200	6.40	46.8	Al.	Mor.	Ala.	Pur.	AC.	Str.	Old.	DA.	PD.	P.	Own.	Nb-Spi.	1/2	Own	4.41	IC.	
42	Pierce-Arrow.....1701	138-144	7.00/17	8-3 1/2 x 5	39.2	385.0	150-3400	6.40	37.6	Al.	Whit.	Ala.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Own	4.58	C	
43	Pierce-Arrow.....1702	138-144	7.50/17	12-3 1/2 x 4	58.8	462.0	185-3400	6.40	42.0	Al.	Whit.	Ala.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Own	4.58	C	
44	Pierce-Arrow.....1703	147	7.50/17	12-3 1/2 x 4	58.8	462.0	185-3400	6.40	40.7	Al.	Whit.	Ala.	Pur.	AC.	Str.	Buf.	D.	Wil.	P.Long.	WG.	Nb-UP.	1/2	Own	4.58	C	
45	Plymouth.....P3	665	5.50/16	6-3 1/2 x 4 1/2	23.4	201.3	82-3600	6.70	46.7	Cl.	Mor.	Ala.	No.	BA.	Car.	NS.	A.	Wil.	P.B.B.	Own.	Nb-UP.	1/2	Own	3.90	C	
46	Plymouth.....P4	745	6.00/16	6-3 1/2 x 4 1/2	23.4	201.3	82-3600	6.70	36.5	Cl.	Mor.	Ala.	Pur.	BA.	Car.	NS.	A.	Wil.	P.B.B.	Own.	Nb-UP.	1/2	Own	4.10	C	
47	Pontiac DeL. 6, 37-26CA	117	6.00/16	6-3 1/2 x 4	28.3	222.7	85-3520	6.20	38.5	Cl.	Mor.	CHI.	No.	AC.	Car.	BO.	D.	Del.	P.Own.	Own.	Nb-Mec.	1/2	Own	4.37	IC.	
48	Pontiac DeL. 8, 37-28A	122	6.50/16	8-3 1/2 x 3 3/4	33.8	248.9	99-2800	6.20	40.5	Cl.	Mor.	CHI.	No.	AC.	Car.	BO.	D.	Del.	P.Own.	Own.	Nb-Mec.	1/2	Own	4.37	IC.	

## ABBREVIATIONS

General  
 o—Others also  
 m—Measured on rim of Flywheel  
 1/2—Semi-floating  
 3/4—Three-quarter floating  
 †—Power Clutch  
 ††—With clearance of .015 the valve is .004 off its seat.  
 §—Computed on basis of displacement, gear ratio, effective tire diameter, and weight with normal load.

(a)—(1/4 to 1/2)  
 A—Above (rods removed from)  
 A—After top center  
 AA—Automatic adjuster  
 Ad—Advanced  
 Al—Aluminum  
 Ala—Aluminum, Anode processed  
 Als—Aluminum with



# Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type	Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	RINGS		Piston Pin Diameter	Piston Pin Locked In	VALVES						IGNITION						FRONT AXLE						Line Number							
				No. and Width Comp.	No. and Width Oil			Head Diameter and Seat Angle			Operating Tappet Clearance	Intake Valve Opens Before or After T.C.	Timing	Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC	Breaker Housing Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)		King Pin Inclination (Degrees)						
								Inlet (Ins.)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)																		Stem Diameter (Ins.)	Inlet	Exhaust	Inlet Tappet Clearance for Valve Timing	No. of Degrees	No. of Flywheel Teeth
BH. R.	Ch-J-6	2-1/8	1-1/8	3/8	R.	1-1/8	30	1-1/8	45	.342	.010H	.010H	.012	7 1/2	B	2 1/4	B	.018	.025	3B	1B	Au. B	2 1/2	1 1/4	6 16	3 1/2-4	1.5	1/8	7 1/2	1			
BH. R.	Ch-J-6	2-1/8	1-1/8	3/8	R.	1-1/8	30	1-1/8	45	.342	.010H	.010H	.012	7 1/2	B	2 1/4	B	.018	.025	3B	1B	Au. B	2 1/2	1 1/4	8 20	2-3	1.5	1/8	7 1/2	2			
BH. R.	Ch-J-9	2-1/8	1-1/8	3/8	R.	1-1/8	30	1-1/8	45	.342	.010H	.010H	.012	7 1/2	B	2 1/4	B	.013	.025	3B	1B	Au. B	2 1/2	1 1/4	8 20	2-3	1.5	1/8	7 1/2	3			
OH. S.	(g) AC-H9	2-1/8	2-1/8	1 1/8	R.	1-1/8	45	1-1/8	45	.375	.015H	.015H	††	13B	5 1/2	B	.015	.025	2B	3 1/2	Au. A	2	1 1/2	6 13 1/4	1 1/4-1 1/2	0-1/8	0-1/8	3 1/4-4 1/4	4				
OH. S.	170x AC-H9	2-1/8	2-1/8	1 1/8	R.	1-1/8	45	1 1/8	45	.375	.015H	.015H	††	14B	6B	.015	.025	10B	4 1/2	B	Au. A	2 1/4	1 1/2	8 17	1 1/4-1 1/2	0-1/8	0-1/8	3 1/4-4 1/4	5				
OH. S.	145x AC-H9	2-1/8	2-1/8	1 1/8	R.	1-1/8	45	1-1/8	45	.375	.015H	.015H	††	14B	6B	.015	.025	10B	4 1/2	B	Au. A	2 1/4	1 1/2	8 17	0-1/8	0-1/8	4 1/2-5 1/2	6					
OH. S.	154x AC-H9	2-1/8	2-1/8	1 1/8	R.	1-1/8	45	1-1/8	45	.375	.015H	.015H	††	14B	6B	.015	.025	10B	4 1/2	B	Au. A	2 1/4	1 1/2	8 17	0-1/8	0-1/8	4 1/2-5 1/2	7					
BH. S.	AC-K7	2-1/8	2-1/8	7/8	R.	1.87	45	1-1/8	45	.341	AA	AA	0	TC	TC	.015	.027	5B	2 1/4	B	Ad. A	2.46	2 1/2	7 25	(c) 0-1/8	(d) 0-1/8	0-1/8	(e) 5'38"	8				
BH. S.	AC-K7	2-1/8	2-1/8	7/8	F.	1.87	45	1.62	45	.341	AA	AA	0	TC	TC	.015	.027	5B	2 1/4	B	Ad. A	2.46	2 1/2	7 25	0-1/8	0-1/8	0-1/8	5'38"	9				
BH. S.	AC-G7	3-1/8	1-1/8	7/8	F.	1.51	45	1.62	45	.339	AA	AA	0	TC	TC	.021	.025	10B	3B	B	Ad. B	2 1/2	2 1/2	9 17	0-1/8	0-1/8	0-1/8	5'38"	10				
OP. S.	AC-G6	3-3/8	1-3/8	7/8	P.	1.51	45	1.39	45	.339	AA	AA	0	TC	TC	.016	.025	4B	1 1/4	B	Ad. B	2 1/2	2 1/2	10 24	0-1/8	0-1/8	0-1/8	4 1/2	11				
OH. O.	112 AC-K11	2-1/8	1-1/8	7/8	R.	1 1/4	30	1 1/4	30	1 1/4	.006H	.013H	.006	9B	3 1/4	B	.020	.040	5B	1 1/4	B	Au. A	2 1/2	1 1/2	5 14	2 1/4-3 1/4	1 1/4-1 1/2	1 1/4-1 1/2	7'10"	12			
OH. O.	112 AC-K11	2-1/8	1-1/8	7/8	R.	1 1/4	30	1 1/4	30	1 1/4	.006H	.013H	.006	9B	3 1/4	B	.020	.040	5B	1 1/4	B	Au. A	2 1/2	1 1/2	5 14	2 1/4-3 1/4	1 1/4-1 1/2	1 1/4-1 1/2	7'10"	13			
LH. G.	155x Ch-J-8	2-1/8	2-1/8	3/4	R.	1 1/4	45	1 1/4	45	.340	.008H	.010H	.014	TC	TC	.020	.025	2A	3 1/4	A	Au. A	2 1/2	1 1/4	5 20	1 1/2	(a) 0-1/8	0-1/8	4 1/2-6	14				
LH. G.	155x Ch-H-10	2-1/8	2-1/8	3/4	F.	1 1/4	45	1 1/4	45	.340	.006H	.010H	.011	2B	3 1/4	B	.018	.025	3A	1 1/4	A	Au. A	2 1/2	1 1/2	6 22	1 1/2	(a) 0-1/8	0-1/8	4 1/2-6	15			
LH. G.	150x Ch-H-10	2-1/8	2-1/8	3/4	F.	1 1/4	45	1 1/4	45	.340	.006H	.010H	.011	2B	3 1/4	B	.018	.025	5A	2A	Au. A	2 1/2	1 1/2	6 21	2	(a) 0-1/8	0-1/8	4 1/2-6	16				
LH. G.	150x Ch-H-10	2-1/8	2-1/8	3/4	F.	1 1/4	45	1 1/4	45	.340	.006H	.010H	.011	2B	3 1/4	B	.018	.025	5A	2A	Au. A	2 1/2	1 1/2	6 17	2	1/4-3/4	0-1/8	4 1/2-5 1/2	17				
LH. G.	110 Ch-J-9	2-3/8	2-3/8	7/8	F.	1 1/4	30	1 1/4	45	.342	.009	.009	.016	7 1/2	B	19B	.015	.025	3B	1 1/4	Au. A	2	2 1/2	7 28	1-2 1/2	1	0-1/8	0-1/8	6	18			
LH. G.	155x Ch-J-8	2-1/8	2-3/8	3/4	F.	1 1/4	45	1 1/4	45	.340	.008H	.010	.014	TC	TC	.020	.025	2A	3 1/4	A	Au. A	2 1/2	1 1/4	5 20	1 1/2	(a) 0-1/8	0-1/8	4 1/2-6	19				
LH. G.	140x Ch-J-8	2-1/8	2-3/8	3/4	F.	1 1/4	45	1 1/4	45	.340	.006H	.008H	.011	6A	2 1/2	A	.020	.025	4A	1 1/4	Au. A	2 1/2	1	5 16	2	1/4-3/4	0-1/8	4 1/2-5 1/2	20				
PH. R.	Ch-6M	3-1/8	1-1/8	1 1/8	F.	1 1/2	30	1 1/2	30	1 1/2	.015C	.015C	.025	6B	2B	.021	.025	1 1/2	B*	Ad.	Ad.	2 1/2	1 1/4	12 32	3	1	1/4	...	21				
OM. O.	150x Ch-H-10	2-1/8	1-3/8	.687	F.	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2	B	.015	.025	4B	1 1/4	B	Au. A	1.80	1.54	4 15.2	8	1	1 1/4-1 1/2	0-1/8	8	22			
OM. O.	100 Ch-7	2-3/8	1-3/8	.750	F.	1.28	45	1.28	45	.310	.013C	.013C	.013	9 1/2	B	.015	.025	4B	1 1/4	B	Au. A	1.80	1.54	5 22	8	1	1 1/4-1 1/2	0-1/8	8	23			
OH. R.	Ch-7	2-3/8	1-3/8	1 1/8	R.	1 1/4	30	1 1/4	45	1 1/4	.010H	.010H	.012	4 1/2	B	1 1/2	B	.018	.025	2B	3 1/4	A	1 1/2	1 1/2	5 11	4 1/2-5 1/2	1	1/8-1 1/8	7 1/2	24			
OH. R.	Ch-J-9	2-3/8	1-3/8	1 1/8	R.	1 1/4	30	1 1/4	45	1 1/4	.010H	.010H	.012	2A	3 1/4	A	.018	.025	TC	...	A	2 1/2	1 1/2	5 15	4-4 1/2	1	1/8-1 1/8	7 1/2	25				
OH. R.	Ch-J-9	2-3/8	1-3/8	1 1/8	R.	1 1/4	30	1 1/4	45	1 1/4	.010H	.010H	.012	4 1/2	B	1 1/2	B	.018	.025	4A	1 1/4	A	2 1/2	1 1/2	5 15	3-4	1	1/8-1 1/8	7 1/2	26			
OH. R.	Ch-J-9	2-3/8	1-3/8	1 1/8	R.	1 1/4	30	1 1/4	45	1 1/4	.010H	.010H	.012	4 1/2	B	1 1/2	B	.018	.025	4A	1 1/4	A	2 1/2	1 1/2	5 15	3-4	1	1/8-1 1/8	7 1/2	27			
H.M. G.	80 Ch-J-8	2-3/8	2-3/8	3/4	R.	1 1/4	45	1 1/4	45	3/8	.008	.010	...	10 1/2	B	4B	.020	.022	BC	BC	Au. A	1 1/2	1 1/2	5 13	0-1/2	1-1 1/2	0-1/2	7	28				
H.M. G.	110 Ch-H-10	2-3/8	2-3/8	3/4	F.	1 1/2	45	1 1/2	45	3/8	.008	.010	...	10 1/2	B	4B	.020	.022	BC	BC	Au. A	1 1/2	1 1/2	7 20	...	1-1 1/2	0-1/2	7	29				
BH. S.	155x AC-K7	2-1/8	2-3/8	7/8	F.	1 1/2	45	1 1/2	45	.341	No	No	No	TC	TC	.015	.026	5B	2 1/4	B	Ad. A	2 1/2	2 1/2	7 25	1/4-1	1/4-1	0-1/8	4'-61"	30				
OM. O.	Ch-J-9	2-3/8	1-3/8	7/8	F.	1.54	45	1.54	45	.311	...	.006C	.004	21B	6 1/4	B	.015	.029	...	2 1/4	B	Au. B	2 1/2	1	6 27	4	1	1 1/4-1 1/2	7 1/2	31			
OM. O.	105 Ch-7	2-3/8	2-3/8	7/8	P.	1.54	45	1 1/4	45	1 1/4	.004C	.006C	.004	21B	6 1/4	B	.020	.022	7B	2 1/4	B	Au. B	2 1/2	1	12 32	1 1/2	1	1 1/4-1 1/2	7 1/2	32			
BH. G.	100 AC-K-7	2-1/8	2-3/8	7/8	F.	1 1/2	45	1 1/2	45	.372	.008H	.015H	.008H	24B	...	...	.022	.027	4Bm	...	Au. A	2	1 1/4	7 17	2 1/2	1 1/2	1/8	1/8	7	33			
BH. G.	90 AC-K-7	2-1/8	1-1/8	7/8	F.	1 1/2	45	1 1/2	45	.372	.008H	.015H	.008	15B	...	...	.020	.027	9Bm	...	Au. B	2	1 1/4	7 18	2	1 1/2	1/8	1/8	7	34			
BH. G.	100 AC-G8	2-1/8	2-3/8	7/8	F.	1 1/2	45	1 1/2	45	.340	.015	.015	.015	5A	...	...	.022	.025	DC	3B	Au. A	2	1 1/2	6 20	2 1/2	1 1/2	1/8	1/8	7	35			
BH. S.	AC-K9	2-1/8	2-3/8	7/8	F.	1 1/2	30	1 1/2	45	3/8	.008H	.011	.012	5B	2B	...	.020	.040	TC	TC	Au. A	2 1/2	1 1/2	6 16	0-N 3/4	1 1/2-1	1 1/2-1	4'51"	36				
BH. S.	AC-K9	2-1/8	2-3/8	7/8	P.	1 1/2	30	1 1/2	45	3/8	.008H	.011	.012	TC	TC	...	.015	.030	2B	3 1/4	Au. A	2 1/2	1 1/2	7 20	0-N 3/4	1 1/2-1	1 1/2-1	4'51"	37				
H. O.	110 AC-Y4 (z)	2-1/8	1-1/8	7/8	F.	1.57	30	1.57	30	1.57	.007H	.010H	...	5B	...	...	.015	.025	4B	...	Au. A	2 1/2	1 1/4	7 17	2 1/2-3 1/2	1 1/2-1 1/2	1 1/2-1 1/2	1 1/2-1 1/2	1 1/2	38			
H. O.	110 AC-Y4 (z)	2-1/8	1-1/8	7/8	F.	1 1/4	30	1 1/4	45	1.40	.007H	.010H	...	5B	...	...	.015	.025	7B	...	Au. A	2 1/2	1 1/4	7 20	2 1/2-3 1/2	1 1/2-1 1							

## 8

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**EDISON**  
**West**

1051



# Edison has written a new page in spark plug history....

Did you ever install a spark plug that you could *guarantee compression-tight*? Did you ever install one that didn't give you plenty of trouble holding the gasket firmly in place? Edison has overcome both difficulties in one bold stroke of engineering. Now there is a spark plug with an absolutely *leak-proof* gasket. You can install these new Edison plugs quickly because the gasket is *built-in*. It assures a perfect, concentric fit—a 100% gas-tight seal.

So much for the unique features of the new Edison Spark Plugs. But that isn't half the story. Ask your jobber at once to tell you how the Edison policy is winning thousands of dealers to this brand. Ask him about Edison protection from chain store and other cut-price competition—about your longer margin of profit—about Edison national advertising and merchandising helps that are putting this product across.

Try the new Edison Spark Plug on one or two tough installations so that from actual experience you will know why this product leads the industry in engineering improvements. In fairness to yourself, check Edison claims and we know what your answer will be.

**EDISON-SPLITDORF  
CORPORATION**

West Orange

New Jersey

ONE OF THE  
*Thomas A Edison*  
INDUSTRIES

*"—the most  
important spark  
plug development  
in recent years..."*



The new  
**Edison** BUILT-IN  
LEAK-PROOF GASKET

# How To Fix Clutches

(Continued from page 25)

as close together as possible, insert the lower end of the eyebolt in the hole in the pressure plate. This will bring the short end of the lever under the hook of the pressure plate and near the strut. Slide the strut upward in the slots of the lug, lift it over the ridge on the end of the lever, and drop it into its groove in the lever.

Place the pressure plate on a block in an arbor press and seat the springs on the small bosses on the pressure plate. Place the cover on top of the

assembled parts as shown in Fig. 4. If the clutch is equipped with anti-rattle springs 5B (Fig. 2), be sure that these are in the position shown in the illustration. See that the tops of the pressure springs are directly under the embossed seats in the cover and that the marks made before disassembling are in the correct location on the cover and pressure plate.

If the clutch is from a 1937 Oldsmobile it will have release lever return springs 5F (Fig. 3) which replace the anti-rattle springs 5B and the bearing plate retainer wires. These should be assembled by placing them on the levers so that the coils are at each side of the pressure plate

lugs and the cross wires straddle the levers, before placing the cover over the assembled parts. On this model it is also necessary to see that the lever guide pins (3) (Fig. 3), which are riveted to the cover, enter the oblong slots in the levers when lowering the cover.

Next compress the cover into place and put the nuts on the eyebolts, screwing them down until their tops are flush with the ends of the eyebolts. The press can then be released and the end of the press spindle applied several times to the inner ends of the levers with just enough pressure to release the clutch and allow the parts to settle into position.

A gage plate as shown in Fig. 5 should be used to adjust the levers. Place the gage plate in the flywheel as shown in Fig. 6, and mount the cover on the flywheel, making sure that the gage plate is centered and that the three flat machined lugs are directly under the levers. Place a straight edge across the center boss of the gage plate as shown in the illustration, and adjust each lever by turning the adjusting nut until the levers are exactly the same height as the boss. Lock the adjusting nuts with a chisel by peening small portions of the nuts into the slots in the eyebolts.

Remove the clutch and gage plate and, if the clutch has a ball type release bearing, install the driven plate and the pressure plate and cover assembly, using a dummy shaft to center the driven plate before tightening the cover holding screws. After tightening the cover screws, remove the dummy shaft. If the clutch has a carbon-graphite release bearing, the release bearing plate assembly should be installed before assembling the unit to the flywheel. It can be mounted on the levers with the three embossed lugs on the spacer plate firmly seated in the slotted ends of the levers. The cross wires of the lever return springs can be snapped into place in the grooves of the three lugs on the bearing plate by use of a hooked tool.

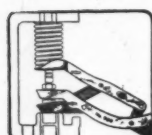
Replace the transmission and floor boards, and adjust the pedal linkage to allow 1 to 1½ in. free pedal travel, making sure that the clearance is sufficient to allow the pedal pad to travel to the floor board without springing the pedal.

## A New K-D LIFTER for the New Motors



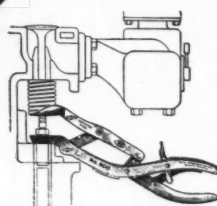
"Hi-Offset" feature for motors with low hung Manifolds and Sweeping Fenders. Total Lift 3".

Allows plenty of working space and clear view of valve when working under fender. Total length only 8¾".



Auxiliary jaws swing into position for motors with unusual clearance between tappet housing and valve spring washer.

No. 900 in position on a Plymouth 1936 Motor. Note generous working space and clear view of valve.



The new K-D No. 900 Lifter is the fastest Valve Lifter to satisfactorily service the new 1935, 1936, and 1937 Plymouth, Dodge, Dodge Truck, De Soto, Chrysler Airstream and Airflow. Also Hudson, Oldsmobile, Pontiac, Studebaker, Terraplane, etc.

The unusually "Hi-Offset" jaws permit its operation on these motors without removing the manifold and the unobstructed vision above the Lifter makes the handling of keepers faster and easier.

It should be distinctly understood, however, that our new No. 900 Lifter will not service all cars. No one Lifter will.

K-D manufacture a number of Lifters, each best serving certain motor designs. You should own a set of K-D Lifters to fit the cars you service.

## No. 600 Lifter with Adjustable Parallel Jaws.



No. 600 UNIVERSAL WITH OFFSET ADJUSTABLE JAWS

Serves practically all L-head motors, early models. A heavy-duty tool with offset jaws to work back of motor housing.

## No. 380 Compressor for "L" Head and "Valve-in-Head" Motors

A fast operating tool adapted to general garage use. A turn of the Geared Hand Wheel raises the first valve spring. This sets the adjustment for remaining springs which are quickly raised by moving Operating Handle up and down. Equipped with automatic lock and furnished with Adjustable Offset Jaws No. 32 and Straight Jaws No. 35.



## No. 425 Lamp Bulb Pliers

Removes and replaces all types of lamp bulbs without injury to fingers or damage to lamp or reflectors. Sharp teeth milled in jaws provide non-slip grip on bulb base.

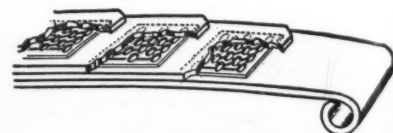
**K-D MANUFACTURING CO.**

Lancaster, Penna., U. S. A.

## Spring Leaf Bearings

### Eliminate Squeaks

NOSQUEEK Spring Leaf Bearings, a product of Certified Auto Products, Inc., Middleburg, Va., are said to eliminate spring squeaks and to improve the riding quality of the car. Each bearing contains 18 grease reservoirs to provide ample lubrication. They are installed between the spring leaves, and prevent the ends of the leaves from digging into each other, thus preserving the original flexibility and shock-absorbing properties of the spring.





## Garagemen Can Aid War On Crime

(Continued from page 23)

what they look like, what cars they were last seen driving. For such information our "Gang-Busters" program is, of course, only one source.

Then I should like to emphasize again the necessity for being always on the alert, always observant. It would do no harm to take careful note of occupants in all strange cars, to watch them for symptoms of nervousness. This is not to say that all drivers who act nervously at a service station are fleeing criminals nor do fleeing criminals invariably betray signs of nervousness. But by being constantly watchful service-station men will be ready for their chance when and if it comes.

If suspicions have definitely been aroused, it might be a good idea to try to get a look at the engine number, as well as the car, its occupants, and the license number. License plates can be switched too easily. And in connection with this, let me stress the necessity for acting quickly. If the license-number of a wanted car is recognized, the information should be hurried to the police immediately, or it may be too late to be of any use.

Careful observation can also be employed in noticing identifying marks on a car. One clue included the information that the car in which the criminal was escaping was a Ford, with the top half of the Ford V-8 sign missing. The solution of another crime depended on finding a car with a running-board from which a small piece of aluminum binding had been broken.

It is not my hope that all service-station men in the country shall immediately turn detective. Common-sense must be applied here as elsewhere. But it does seem to me that such men are in an unusually favorable position for observing cars, watching for fugitives, and supplying the police with needed bits of information. And the desire to help in the crusade against crime need not be altogether altruistic. Reward money is frequently substantial.

### Jenkins Designing New Car for Record Attack

First body designs for Ab Jenkins' 3600 h.p. two-motored racing car in which the noted driver will attempt to lower Sir Malcolm Campbell's Bluebird record of 301 m.p.h., will be ready soon, Jenkins has announced.

Jenkins' car, which will incorporate many airplane features of design, will have a speed of better than 360 miles per hour, he believes, and will be perfectly balanced even at 350 m.p.h.

"One of the chief problems in designing a racing car capable of doing better than 350 m.p.h. is to keep it balanced at this tremendous speed," he said. "At this speed a car has a tendency to take off like an airplane, and this shifts the balance."

"The run will be made at the Bonneville Salt Beds in Utah," Jenkins said, "as that is the best speedway surface in the world. I

plan to use the same 13-mile straight-away that Campbell used. I am having flaps, or side wings, similar to those on an airplane, designed to assist in braking. These hinged wings will be operated by a lever, and pulled open by the motor when I want to stop the car. A horizontal rudder will also be used to keep the front end of the car from lifting up and trying to take off."

Jenkins, who is associated with the experimental department of the Auburn Automobile Co., Connorsville, Ind., said that work on laying out the chassis of the racer had already begun. Two 1800 h.p. engines will be used on a 200-in. wheelbase chassis, one at each end, and traction will be from all four wheels. The front

engine will drive direct and the front wheels will brake against compression. The rear engine will free wheel, thus eliminating the necessity of synchronization.

Auggie Duesenberg, Russell Howe, Jim Robinson, and a score of others prominent in racing car design, have been called in. Wind tunnel tests on the streamlined body design are now being made at the Auburn plants.

Jenkins' Mormon Meteor, in which he established 144 speed and endurance records last summer at Bonneville, is now being rebuilt in preparation for an assault on all records from 10 miles to 24 hours. Ab plans using the Meteor early in the spring to set up a new 24-hour record which he now holds at 153.77 m.p.h.



— and right into

**THE ROAD!**



A sprint—a flop—down the drive—past the hedge —and right into the road! Jam on the brakes, brother. It's hit or miss, and if anybody stops it's got to be you. They don't put brakes on sleds, so you'd better have AMCO on your car.

**ASBESTOS MANUFACTURING CO., Huntington, Ind.**

# Flex-Head

**PADDED FEET  
FOR BODY TOOLS**



**...DO NOT  
DENT, SCRATCH OR  
MAR BODY SURFACES**

Smooth workers, these new "Flex-Heads." Reshape doors, window frames, fenders and body sections—without marring surface or flattening out moldings. "Flex-Heads" are made of special resilient compound — conform to any contour — grip at an angle without slipping — and transmit tons of pressure over wide area without injury to part worked on. No need to shape wooden blocks or follow up with reworking or refinishing.



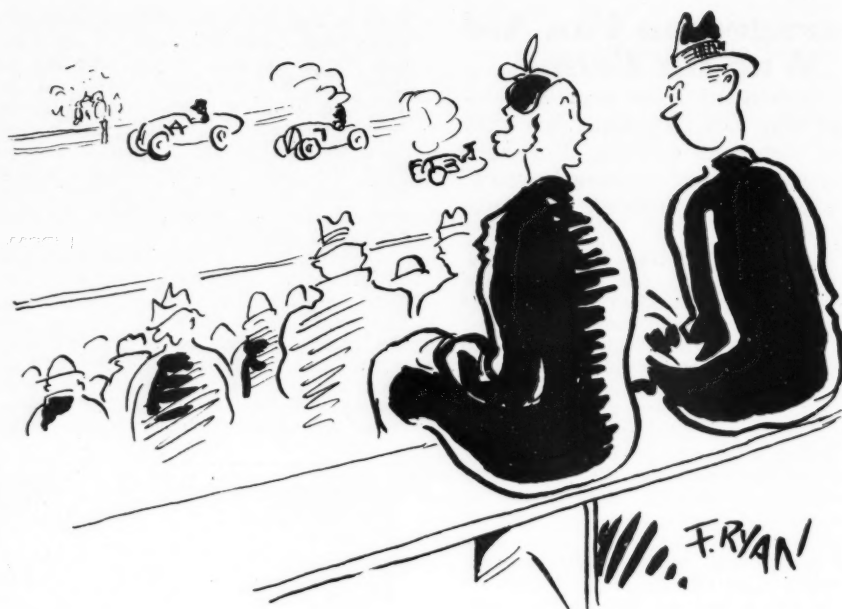
"Flex-Heads" are vulcanized to forged steel insert with 1 1/4" standard pipe thread for use with Blackhawk Porto-Power ram and extensions — or ordinary mechanical body jacks. These great time savers and money makers come in two practical sizes — the Z-131 (5-inch dia.) and Z-128 (3 1/4-inch dia.). Two of each size required for all around shop use.

Ask your jobber salesman for S-69 assortment — or write for literature.

**BLACKHAWK MFG. CO.**  
Milwaukee, Wisconsin

SEE OPPOSITE PAGE

**BLACKHAWK**



"I thought you said these were midget racers. Those men are as big as we are."

## Edde Oil Filter Has Magnetic Separator

The Edde Mfg. Co., 100 E. Walnut St., Milwaukee, Wis., has developed an oil filter using a permanent magnetic separator. This high quality filtering element is said to effectively remove all dirt, dust, sludge and metal particles from the motor oil, and to restore the oil to its natural



color. Filtering element will run from five to ten thousand miles under normal conditions, and is replaced by simply unscrewing the nut at the top of the container, lifting out the old unit and sliding the new one in place. Priced at \$4.50 for the Standard Model and \$5.50 for the Supreme Model.

## Zecol Sidewalk and Floor Stand

An attractive ZECOL sidewalk or floor stand is one of the numerous sales helps offered by ZECOL, Inc., 841 N. Water St., Milwaukee, Wis., makers of Zecol Wax and Zecol Scum Remover. Write for details of their proposition.

## Grey-Rock Sales Conference

Thirty-five salesmen, branch managers and field service engineers from the Boston, New York, Atlanta, Philadelphia and Pittsburgh Territories met in Mannheim, Jan. 9-10 to review the Grey-Rock Program for 1937.

The opening feature of the program was a complete tour of the plants and research laboratories. In connection with the Sales Conference a dinner was held at which factory executives and superintendents were present. Factory announcement stated that the enthusiasm shown at the conference indicates that 1937 will again make history as Grey-Rock's biggest year.

## Name Plate Emblem Identifies Dealer

The Douglas Co., 1130 South 7th St., Minneapolis, Minn., manufactures an advertising name plate which fits above the state license plate. Each plate is 10 1/2 in. wide x 3 in. high in



the center, and can be made up with special design, dealer's name or trademark, or with a red jewel safety reflector. Write for special design and prices.



# Short Cuts to Bigger Profits with Porto-Power!

What a stand-out the new Porto-Power S-100 is! Larger — sturdier — streamlined — with remarkable improved features and accessories including Blackhawk's sensational and exclusive new "Flex-Heads."

The new S-100 is completely modern in design — with increased range for faster, better body and frame work, straightening, pushing, bending, pressing, pulling, and hundreds of other jobs in garages, bodyshops, and service stations. Has new, larger, 4-column press with many improvements and greater capacity — all-directional remotely controlled hydraulic ram — ultra-modern welded steel stand with rubber-matted steel drawer and upper and lower accessory trays. It is "tops" in turning tough jobs into bigger profits.

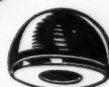
Ask your jobber salesman for demonstration of the new S-100 Porto-Power or the S-50 described below — and send for new booklet "Crash Profits."



New  
C-CLAMP  
For Frame  
Work



New  
HINGE PIN  
PUSHER



New  
FLEX-  
HEADS

**BLACKHAWK MFG. CO.**  
Dept. MA 2 MILWAUKEE, WISCONSIN  
Exclusive Canadian Distributor:  
The Canadian Fairbanks-Morse Co., Ltd.  
Branches in All Principal Cities

**S-100**  
Dealer Price  
**\$195.75**  
Slightly higher  
on West Coast  
and in Canada.



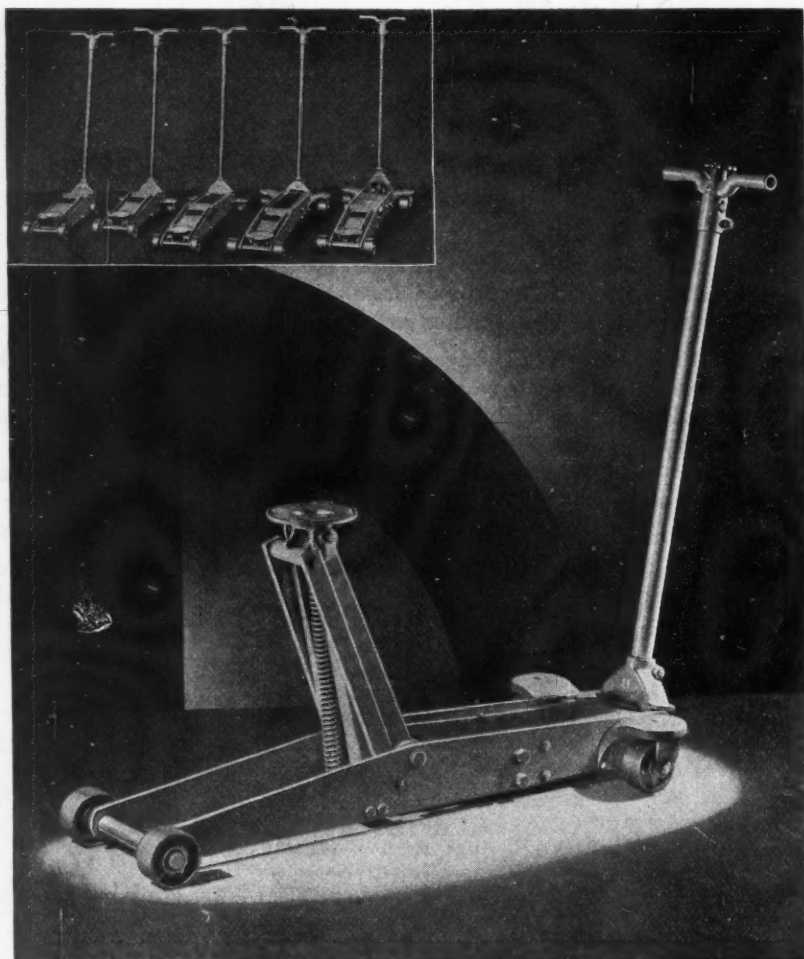
**Model S-50**, standard Porto-Power, is the original "complete workshop on wheels," backed by a record of over 10,000 proud and satisfied users. Not as complete as S-100, has only 27 attachments. **\$114.50**  
Dealer price .....  
Slightly higher on West Coast and in Canada.



See  
opposite  
page

## BLACKHAWK Porto-Power

To see the Floor Jacks of tomorrow  
look at the new H-W Jacks **TODAY!**



## 5 AMAZING NEW MODELS - - each a leader in its class - -

Keeping pace with present and future needs of the industry, Hein-Werner presents a complete line of hydraulic floor jacks.

All 5 new models have structural steel side members... Low at 4"—and saddle high point at 24½"... 90° stroke on all handles... Saddles are 6½" in diameter.

All models have steel hydraulic units except Model 0324G... All have safety valves and by-passes — and automatic oil level... And all have release valves that can be locked and key removed.

**MODEL 0237J—CURB JACK**, (without swivel wheels)... 2 ton capacity \$29.75 (West Coast \$31.75).

**MODEL 0237K—CURB JACK**, (with swivel wheels)... 2 ton capacity \$32.50 (West Coast \$35.00).

**MODEL 0237L—FLOOR JACK**... 2 ton capacity \$37.50 (West Coast \$40.00).

**MODEL 0337H—FLOOR JACK**... 3 ton capacity \$49.50 (West Coast \$55.00).

**MODEL 0324G—FLOOR JACK**... 4 ton capacity \$57.50 (West Coast \$63.00).

All prices are net to dealer... Ask for details on these floor jacks—also on complete line of passenger car and truck hand jacks.

**HEIN-WERNER MOTOR PARTS CORP.**  
Waukesha, Wisconsin



### Lou Dall Resigns

Lou A. Dall, pioneer piston manufacturer, and lately vice-president in charge of Replacement Sales of Aluminum Industries, Inc., Cincinnati, Ohio, resigned his position Jan. 1 and has expressed an intention of retiring from the industry.

In 1916, he organized the Dall Motor Parts Company at Vermilion, Ohio. In 1922, the plant was moved to Cleveland, Ohio.

In 1933, with his brother, J. R. Dall, the company was reorganized and the name changed to The Dall Manufacturing Company. Chief among the Dall products was the Dall cast iron piston, which is so well-known because of its extensive use in automotive engines, both for standard equipment and replacement.

The Dall Manufacturing Company continued operations under the Dall management until 1935, when the entire capital stock of the company was sold to Aluminum Industries, Inc., Cincinnati, Ohio, by whom it is now being operated.

### Voltohmmeter Tests

#### Radio and P. A. Systems

Burton-Rogers Co., 755 Boylston St., Boston, Mass., has announced a new voltohm output meter for testing radio and Public Address systems. It is of a size that can be conveniently carried in the pocket. It has a large three-inch meter with two color scale and accurate D'Arsonval movement with knife-edge pointer



and zero adjuster. The D.C. Milli-ampere scale reads 0-1, 0-10 and 0-250. The output scales are provided, one for the voice coil circuit and the other has a blocking condenser. The two ohm scales are direct reading 10-ohms from ½ to 500, hi-ohms from 200 to 500,000.

### Complete Brakset Chart

Among the many merchandising helps offered for 1937 by the United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa., is a 16-page chart containing illustrations and instructions for maintenance, conditioning and relining of all types of passenger car and truck brakes. It also contains a complete catalog of Balanced Braksets in alphabetical and numerical listings together with list prices and a cross index with B.L.M.A. numbers covering two pages. There are also two complete pages of trouble shooting information, and a very unusual presentation of recognized legal and recommended safe stopping distances in effect in the various sections of the country.

MOTOR AGE, February, 1937



## Windshield Cleaner Service

(Continued from page 21)

operation will occur at this point. The proper lubricant to use is Trico Wiperlube, supplied by the Trico Products Corporation. If this lubricant is not available, vaseline may be used, although it will have a tendency to harden during cold weather. Inasmuch as these arms are operated by gears they must be properly synchronized to give equal wiping action to each blade. It is a good plan to remove only one shaft at a time, so that when it is reinstalled the other blade can be placed in operation and the sweep of the blade that is being installed can be checked against the one in operation to be sure that the gears on the shaft are meshed with the proper teeth of the sector gear.

A unit replacement package is supplied for all Trico make windshield wipers, and in any case when it is necessary to remove the motor and overhaul it, all of the parts supplied in the repair packet should be used. The actual repairing of the motor requires very little time, but the time required to remove it from the car and reinstall it certainly does not justify taking a chance with the other old parts.

Carefully check the bearing point of the paddle shaft in the body and cover of the motor. If this bearing point is worn so that the shaft is loose, the motor should be replaced as there is no way to compensate for this wear. While this bearing does not seal air, any looseness will permit the shaft and paddle to weave from side to side and cause distortion of the flexible material of the paddle. The inside width of the body should be checked to be sure that the paddle makes a uniform contact throughout its travel. If the body is sprung so that it is wider in the center than at the ends it can sometimes be restored to its original shape by squeezing it in a vise. If it is too narrow in the center it may be expanded by twisting an elliptical tool (like a hammer handle) in the body.

Before the new paddle is installed it should be lubricated between its two halves with Wiperlube, and the edges of the flexible material should be formed so that they turn toward each other. When the paddle is inserted in the body it should be held vertically and pressed straight down in the center of the body, not slipped in from one end with a wiping motion. Then the cover should be installed, without gaskets, and the paddle shaft turned back and forth in short strokes to form the top edges of the flexible material. Then the cover and paddle should be removed and inspected to be sure that the edges are properly formed. The paddle and cover with the new gaskets, should then be reinstalled and the cover retaining screws tightened, starting at the center on each side. Next, the other parts contained in the repair package are installed, and the motor tested for operation before it is reinstalled in the car.

There are various types of windshield wiper motor installations, the older model cars having the motor located above the windshield, either on the outside of the header board or concealed between the header board and the outside metal panel. Some of the models have merely a header trim panel to conceal the motor while others have either a metal or wooden header board. When the header trim panel only is used, the motor is reached by simply pulling the trim panel loose at the top and allowing it to hang down, being held by the windshield garnish moulding. If the trim is attached to the header board, the complete board has to be removed.

Later model cars which have the windshield wiper motor mounted underneath the instrument panel are somewhat easier to remove inasmuch as they do not require the removal of trim material. The majority of them, however, require that the glove compartment be removed from the instrument panel to reach the linkage connecting the right hand wiper mechanism to the motor.

## Classified

Motor Temperature Gauges repaired \$1.50. Missing parts replaced. Originators of this service. Factory Methods. Radiator Shutter Thermostats repaired \$2.50. United Speedometer Repair Co., Inc., 436 W. 57th St., New York City.

INVENTORS—Protect your rights. Before disclosing your invention to anyone send for free blank form "Evidence of Conception" and instructions. Personal attention given all cases. Lancaster, Allwine & Rommel, 415 Bowen Building, Washington, D. C.

## How to do -

### 9 MAJOR AUTO SERVICE JOBS



South Bend Precision Lathes can be purchased for as low as \$85 less motor drive, and on easy payments of \$15 down and \$6.00 a month. Write for Catalog 15-K. Sent to any address free, postpaid. A post card will bring it.

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16" x 6' Underneath Belt Motor Driven Quick Change Gear Lathe.....\$889 (\$87.00 Down, \$38.50 a mo., 22 mos.)

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- Waterproof
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WHEN you see so many Crescent distributors "going places" with this high quality, fast-selling line, think what Wiry Joe can also mean to YOU! Each year our volume has shown a healthy increase — which surely indicates that more and more distributors are finding in Crescent Wiry Joe Products their way to bigger volume and more profits.



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Largest Independent Manufacturer of Replacement Automotive Wiring in U. S. A.



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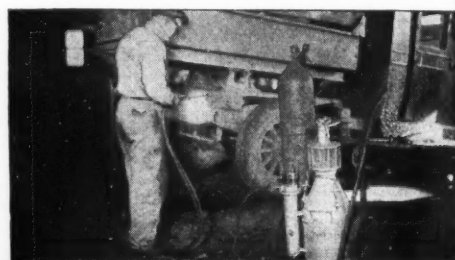


Good Equipment brings business . . . . Good Workmanship keeps it . . . . and Good Business demands that you use a

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are the finest that money can buy



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Ten 'CV' Chrome-Vanadium Steel  $\frac{3}{4}$ " square drive sockets, with double hexagon openings  $\frac{1}{8}$ " to  $1\frac{1}{8}$ ", T-Handle and Ratchet Handle with 2 extensions, in metal box. Ask your Jobber, or send post-card for catalog "A". Bonney Forge & Tool Works, Allentown, Penna.

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Thexton Peening Tool cuts costs so you can peen pistons and install Thexton Expanders at a price usually asked for peening alone!

## THEXTON

MANUFACTURING CO., Inc.  
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Manufacturers of  
**THEXTON PISTON SKIRT EXPANDERS**



## B SAFETY LIGHTING EQUIPMENT

# B SHO-WAY

## FOG LAMP

### RIGHT NOW!

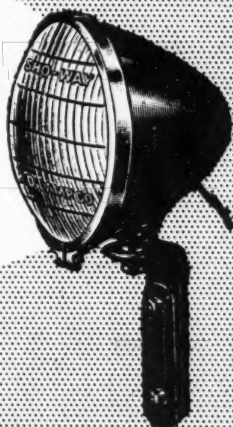
Conquer fog, rain, sleet and snow with K-D SHO-WAY. Maximum visibility at any angle. New curved 6" lens of special amber glass.

Silver-plated, non-tarnishable reflector.

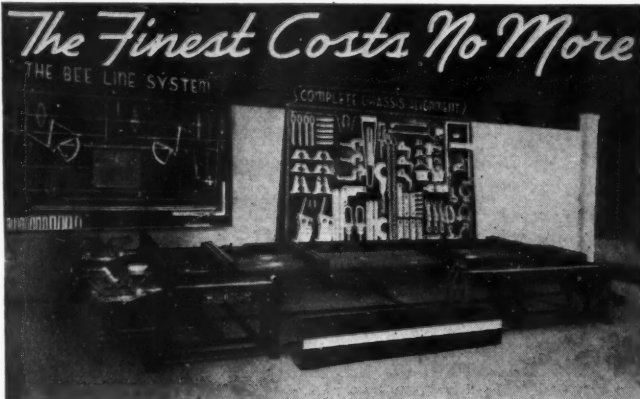
Pre-focused Mazda bulb.

Black and chromium or All chromium.

Write for catalog and 1937 chart of state lighting laws.



**THE K-D LAMP COMPANY**  
CINCINNATI, OHIO



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When today you can buy America's Finest Automotive Alignment Equipment made by the originators of Precision Alignment Equipment at no extra cost.

The first alignment systems for the handling of all phases of wheel alignment, frame and axle straightening, were placed on the market by the BEE-LINE MFG. COMPANY.

In the past years Bee-Line's position has remained unchallenged—Why be content with a substitute? Let our representative call and explain to you why BEE-LINE is the Finest Automotive Alignment Equipment made in America.

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DAVENPORT

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**Colorful**  
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**CONTAINS 25 EACH, No. 4000 VALVE CORES, No. 880 VALVE CAPS AND No. 9006 DUBLCHCK CAPS. THEY'RE THREE FAST MOVERS.**

Here's a display that will sell Schrader Valve Cores, Valve Caps and Dublcheks to those car owners who just "didn't think" to buy. It's the reminder with a punch! Stimulates "impulse" buying.

It's always at work; stops prospects; tells its own sales story; carries its own stock and delivers merchandise to customers. Hangs on the wall, or stands on the counter, or in the island cabinet. Takes up very little space. Three brilliant colors catch the eye. Easy to refill from standard packages.

You pay only for the small quantity of merchandise this display contains. Actually, you save when you buy it!

Your supplier has No. 8800's ready to go to work for you. Send him your order for as many as you need—Today!

Dealer Price in U. S. A.

**\$3.50**

COMPLETE

A. SCHRADER'S SON, Division of Scovill Manufacturing Company, Inc., BROOKLYN, N.Y.

**Schrader**  
REG. U. S. PAT. OFF.

**No. 8800**

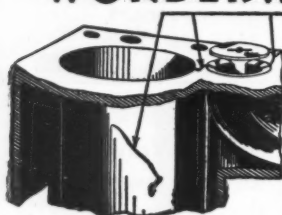
**DISPLAY MERCHANDISER**

## IMPROVES RESULTS CUTS COSTS



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## VALVEPORT AND INSIDE CYLINDER CRACKS CURED WITH WONDERWELD



No need for tedious, 30-hour engine tear-down jobs to seal valve port and inside cylinder cracks. Wonder Weld does the job permanently in 30 minutes.

MILLER MFG. CO.  
1218 KAIGHN AVE. CAMDEN, N. J.



## Flint the Loss-Proof Compression SPARK PLUG!

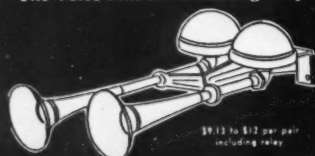
The favorite replacement plug with leading garage and service stations because it produces maximum power not only in the older type of motors but also in the latest type of high-speed, high compression motors.

Order from your jobber!  
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C. V. S. Manufacturing Co.  
Flint, Michigan

## SPARTON ELECTRIC AIR-TONED HORNS

"The Voice that Rules the Highway"



Powerful commanding Sparton Horns help make high speed driving safe. Write for Horn Catalogue and complete information.

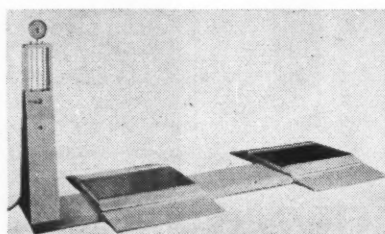
THE SPARKS WITHINGTON CO. Jackson, Michigan U. S. A.

## Ray Day Announces New Aluminum-Alloy Piston

A "steel-bound" aluminum-alloy piston said to possess positive constant-clearance characteristics and freedom from cold slap has been announced to the industry by the Ray Day Piston Corp., Detroit, Mich. It is standard equipment in two 1937 engines—a V-8 passenger car engine and a heavy-duty marine engine.

## Shurtest Announces New Brake Tester

The Shurtest Mfg. Co., 5724 Armistage Ave., Chicago, Ill., has announced a brake testing machine. It is made in two sizes, Model A-1 being for pleasure cars and light delivery trucks, and Model B-1 for all types of trucks. The machine consists of two tables, and a tower at one end in which is housed an electrically



driven hydraulic pump. Two gage glasses record the braking effort of each wheel, and the circular gage records the test applied to the front wheels to assist in equalizing the rear wheels. In operation, the vehicle is driven onto the machine, the brakes applied, and the hydraulic pump in the tower started. The pump is connected to the tables in which are located hydraulic cylinders, which, when pressure is applied by the pump, operate to move the tables, which records the braking power of the wheels.

## Midget Ban Lifted For AAA Drivers

The ban against "big league" drivers competing in midget auto races in many sections of the United States has been lifted by the Contest Board of the American Automobile Association, governing body of the big car competition. The Board decided at its annual meeting in New York last month (January) that any of its registered personnel could take part in the "doodlebug" events, although the Midgets are not supervised by the AAA Contest Board.

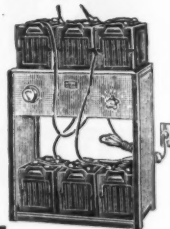
## Plan Arc Welding Foundation

The Lincoln Electric Co. has completed its plans for establishing a Fund and Foundation to encourage study and research for benefit of the arc welding industry.

This new fund, which was voted by directors of the company at the turn of the year, has been named "The James F. Lincoln Arc Welding Foundation," in honor of James F. Lincoln, president of the Lincoln Electric Co.

## Handy

**BATTERY CHARGERS**  
LOWER OPERATING COST  
MEANS MORE PROFIT FOR  
YOU. No. 6-R Charging Rack.  
6-batt. size. Oversize tapped  
transformer. Control dial. Com-  
pact, sturdy rack. \$28.00  
Price without bulb  
WRITE for Bulletins on com-  
plete line of "HANDY"  
chargers, testers and racks.  
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4375 Duncan Ave., St. Louis, Mo.  
GUARANTEED for 2 YEARS



## 7 WAYS TO SAFER DRIVING Seven Models of BUELL AIR HORNS

Priced from \$14.85 to \$109.50

A complete set-up for all classes of buyers  
For Passenger Cars, Buses, Trucks, Boats, Trains



BUELL MANUFACTURING COMPANY  
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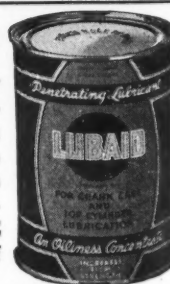
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use Weatherhead fuel lines as  
original equipment. Can we give  
you any better proof of quality?

THE WEATHERHEAD CO.  
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## LUBAID

THE sensational new  
product that in-  
creases film strength  
of motor oils 200 to  
500%, keeps motors  
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Lubaid's guarantee of  
performance.



LUBAID COMPANY, Milwaukee, Wis.

ASK FOR LIST OF JOB-  
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## Postoria fenders

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THE FOSTORIA PRESSED  
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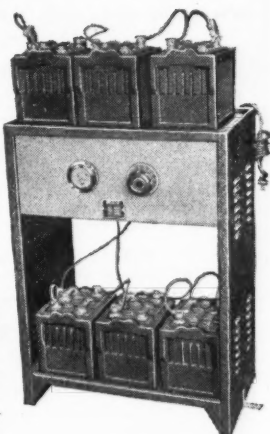


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SHOP  
WORKS  
WHILE  
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SLEEP  
A ONE  
UNIT  
COMPLETE  
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**\$39.50**

Get your share of Battery Charging business. Only 2 feet of floor space required. This unit will pay for itself quickly.



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Battery Shop constructed of welded steel. Finished in baked black wrinkled enamel. Red panel. Lamp cord with attachment plug. Charging Jumpers complete with leads. Large over size transformer and 6 Amp. bulb. Accurate ammeter indicates charging rate. Operates from 110 volt A.C. Removable heavy Rubber Shelves.

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**TOUGH  
TOOLS  
for  
TOUGH  
JOBS**

BACKED BY  
20 years  
experience

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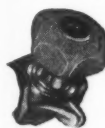
**SHOP  
KINKS**

SHORT-CUTS  
for REPAIRING  
all MAKES of  
CARS and TRUCKS

SPECIAL SECTIONS  
for  
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Free Book. Send today for this free guide to short cuts in shop practice. Full of shop-tested ideas that make money for you.

**SINKO SPIN-UR-WHEEL**



This attractive aid to parking, backing, turning is a fast-seller to car owners. Instantly attachable, it fits and ornaments all steering wheels. Comes in five popular colors with base finished in chrome or Japan.

Ask your jobber for full information.

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**CHAMPION Tire Groover  
Means Extra  
PROFITS**



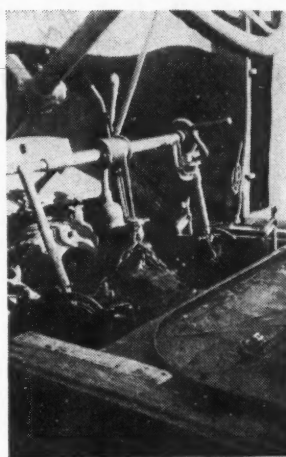
Exclusive features! One hand control! Heats quickly and is easy to operate. The New Champion has a removable heating element, easily and quickly replaced. For bigger profits in tire grooving, get the

New Champion. Write today for illustrated folder and full information.

**ALLIED MANUFACTURERS, INC.**

408 River St.

Ypsilanti, Mich.



**THE** transmission hoist shown above is the invention of William Q. Faulk, of Faulk's Garage, St. Petersburg, Fla. It consists of a cross-bar and two uprights, with a winch for raising and lowering the transmission. A wide range of adjustment is provided to adapt the hoist to any make of car.

**Supco Introduces**

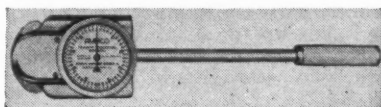
**New Brake Fluid**

A new hydraulic brake fluid, the result of several years of laboratory and road testing, has been announced by Supco Products Corp., 109 West 64th St., New York City. This fluid is said to be radically different in formula from other fluids, and is not affected by temperature changes. The maker also states that it will not cause deterioration of rubber, can't rust or corrode metal, and that it will mix with all standard brands of brake fluid. For complete details, write the manufacturer.

**Tension Indicating Wrench**

**Insures Uniform Tightening**

A new cylinder head bolt wrench has been developed by the Automotive Maintenance Machinery Co., 2112



Commonwealth Ave., North Chicago, Ill. This wrench is equipped with a dial to register the pounds pull applied to the bolt, so that the head will be uniformly tightened. The wrench can also be used to tighten bearing caps. Price \$17.50.

**Perfect  
AUTOMOTIVE  
PRODUCTS**



**Don't Order Until**

You have seen for yourself the splendid possibilities of the **BLACKSTONE LINE** of PERFECT Automotive Products.

Standard Replacement Parts Speedometer—Carburetor Lighting & Ignition—Fuel Pump.

Quality Replacement Parts at the lowest prices—An unbeatable combination by which we guarantee

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**SAVE  
MONEY**  
and get  
**BETTER  
FINISH**

With

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**No. 97**

**PAINTING UNIT**

An ideal outfit for all types of material. Comes with the **NEW** and **PHENOMENAL** Thor Model 7, Gun—a most efficient Oil and Water Extractor and 25 ft. of 5/16" Air Hose and Connections.

Use "BINKS" There is a Difference

Send for complete catalog with valuable information on Spray Equipment

**Makers of  
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**BINKS MANUFACTURING CO.**  
Carroll at Kedzie Avenue  
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## SEEPAGE OF COOLING LIQUIDS RUINS ANY HEAD GASKET

Unless  
Installed  
the  
"Factory Way"  
COATED WITH  
GENUINE  
"PERFECT SEAL"



AS SPECIFIED BY  
16 OF THE LEADING  
CAR MANUFACTURERS

Ask Your Jobber or the Car Dis-  
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### BUILD A BOAT

Precision Built Boat Parts ready for assembling. As-  
semble it Yourself. Save large percentage of cost. Boats  
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new 32-page Boat catalog.

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For  
**DEPENDABLE QUALITY**  
and  
**SERVICE**



**Lion Auto Parts & Mfg. Co., Inc.**  
1920 So. Michigan Ave.  
Chicago, Ill.

The Thermometer is going  
DOWN  
"EVEREADY  
PRESTONE"  
Sales are going  
UP

Now is the Time to Take Delivery and  
Cash In.

### Campbell C.S.R.A. Champ

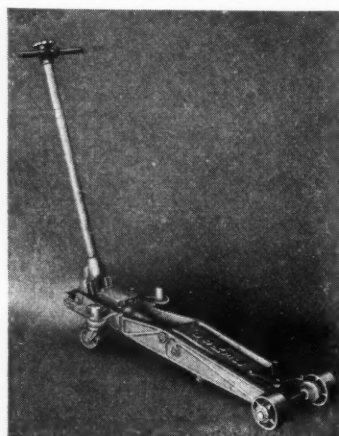
The Central States Racing Asso-  
ciation announced recently that Red  
Campbell of Indianapolis won enough  
points to make him 1936 C.S.R.A.  
champion while second place went to  
Everet Saylor.

The C.S.R.A. with offices in Day-  
ton, Ohio, an independent organiza-  
tion, sanctioned meets in Sharon, Pa.,  
Dayton and Greenville, Ohio, and at  
the Winchester, Fort Wayne and  
Jungle Park bowls in Indiana. Nine-  
teen thirty-seven promises to offer  
more events on the C.S.R.A. circuit  
since the organization intends to sanc-  
tion races at various midwestern  
fairs. Guaranteeing a minimum  
purse of one thousand dollars during  
1936 the C.S.R.A. is looking towards  
higher purses for the coming season,  
besides classifying cars into A and  
B divisions. In this way slower cars  
will compete against each other on  
more even terms while competing for  
their share of the purse.

### Remco Has New

#### Hydraulic Jack

Manley Products Corp., York, Pa.,  
has announced a new hydraulic jack  
with a hydraulic positioning feature.



The jack has a long handle and a low  
frame, with a lift starting at 3 7/8 in.  
and goes up to 24 in. Safety cut out  
valve prevents overloading. Made in  
two types, garage and curb.

### New Coil Piston Ring Catalog

A new catalog of Coil Piston Rings is  
now available. Specifications are given  
for every make of motor, and the catalog  
is punched to fit standard jobber catalog  
binders. Write National Coil Piston Ring  
Sales Corp., 3721 Washington Blvd., St.  
Louis, Mo.

### A NEW LOW PRICED STEER - O - MASTER

A complete front end and wheel align-  
ment service unit, all analytical and cor-  
rective equipment included, at a price that  
makes this type of service more profitable  
than ever. Write for details.

**RIESS MANUFACTURING CO.**  
Kokomo, Indiana

Radiator, battery repairing  
and all sorts of soldering  
jobs easily done with the

### TORIT

Acetylene Torch  
No. 23



Simply connect to  
Presto Tank. Includes  
a set of 4 tips. Price, \$6.75.

**TORIT MFG. CO.**  
290 Walnut St., St. Paul, Minn.

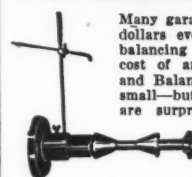


NEW C250 5 METAL DRAWER  
COMPLETE CHEVROLET ASSORTMENT  
Write for C250 Catalogue  
**L-LINKERT CARBURETOR CO.**  
INDIANAPOLIS, INDIANA

There's Money in  
Wheel Balancing  
Service!



Pat. No. 2036757



Many garages are making hundreds of  
dollars every year by rendering wheel  
balancing service. Why not you? The  
cost of an L & H Balancing Stand  
and Balancing Weights is surprisingly  
small—but the profits they will earn  
are surprisingly large. Investigate!

WRITE  
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CIRCULAR!

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16517 Wisconsin, Detroit, Mich.

### HACKETT Universal ROLLER

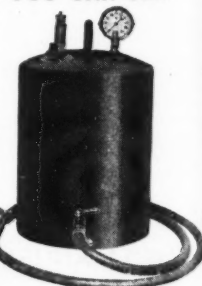


**NOW IN BIG DEMAND**  
New Type Universal Blade, fits all arms. Blade  
rolls in action, no bending of rubbers. 7-ply  
wiping features give 100% wiping, therefore, clear  
vision at all times.

**HACKETT AUTOMOTIVE ACCESSORIES CORP.**  
Providence, R. I. U. S. A.  
Mfrs. of Wiper Arms, Dual Wiper Attachments, In-  
side Wipers, License Plate Frames, Cigar Lighters,  
Magnetic Trouble Lights, Shimmy Stops, Parking  
and Fender Guides, etc.

### A SAFE PRESSURE BLEEDER TANK AT A PRICE YOU CAN PAY

This heavy-duty  
non-tipping Bleeder  
Tank with long  
hose and attach-  
ments—gauge, air  
valve and SAFETY  
VALVE—will help  
every repairman do  
a better and quicker  
bleeding job. If your  
jobber isn't hand-  
ling them write  
direct to



**CURTISS &  
SMITH MFG.  
CORP.**  
Pottstown, Pa.



## "Extra" Features Are Standard On WILMINGTON COMPRESSORS

Tucked into a corner, this Wilmington Compressor makes itself felt all over the shop in work done faster, easier, cheaper.



It stays in order. Check valve opens and stays open while motor runs, can't pound itself to pieces. Unloader prevents burning out motor. Intake filter prevents piston wear. Big bearings last years. Valves in cages for quick change prevent long shut-downs. Timken oversize bearings. It's a honey! Send for details.

**AUTO  
Compressor Co.**  
Wilmington,  
Ohio

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## GASKETS

PREDOMINATE in original equipment of motors for passenger cars, trucks, busses, tractors, airplanes, motor boats, and motorcycles.

**VICTOR MANUFACTURING & GASKET CO.**  
P.O. BOX 1333 5750 ROOSEVELT ROAD, CHICAGO, U.S.A.  
WORLD'S LARGEST GASKET MANUFACTURER

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Electrical instruments essential to good service are the Hoyt Junior Cell Tester and Starter Current Indicator that tell without connections. Ask your jobber or write us. Burton-Rogers Company, 755 Boylston Street, Boston, Massachusetts.

## ROGERS



## TRADE MARK NOC-OUT HOSE CLAMPS

THE HOSE CLAMP WITH THE THUMB SCREW

Standard equipment of the automotive industry. Adjustable - one size equals many. Quick tightening, perfect seal. At all Jobbers.

Pat. No. 1,382,813.

**WITTEK MFG. CO.**  
4305 W. 24th Pl., Chicago, U.S.A.

## International Formula Ok'd

(Continued from page 36)

ing weight minimum. For non-supercharged cars, the minimum displacement is 61.02 cu. in. with a minimum weight of 881.84 lb.; the maximum displacement is 274.59 cu. in. with a minimum weight of 1,873.91 lb. For supercharged cars, the minimum displacement is 40.64 cu. in. with a minimum weight of 881.84 lb.; the maximum displacement is 183.06 cu. in. with a minimum weight of 1,873.91 lb.

Although it was said at national headquarters of the AAA Contest Board in Washington, D. C., that the Roosevelt Raceway management had already signified its intention of accepting the new International Formula for 1938, it was not known whether Indianapolis would change the present rules. It was indicated that the historic brick oval might retain the current specifications, although a definite commitment was not forthcoming.

## Rose Nosed Out

(Continued from page 41)

headquarters in Washington, D. C., after the New York meeting.

Although five drivers are dropped from the revised standing because the point-per-mile system allows only 10 places in each race while the proposed Grand Prix chart provides 12 places, the standing was not otherwise materially effected by the change. A number of changes took place along the line, but none occurred in the first six places of the standing.

The point-per-mile system of awards allows the winner one point for each mile plus a bonus of 20 per cent; second place received 90 per cent of one point per mile; third, 80 per cent; fourth, 70 per cent; fifth, 60 per cent; sixth, 50 per cent; seventh, 40 per cent; eighth, 30 per cent; ninth, 20 per cent; tenth, 10 per cent.

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